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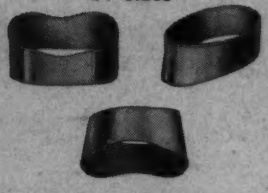

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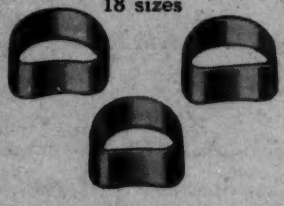

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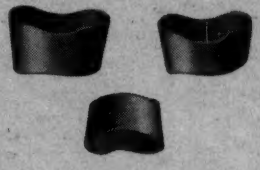

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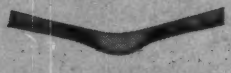

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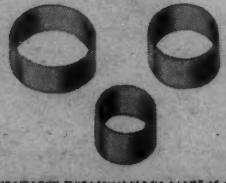

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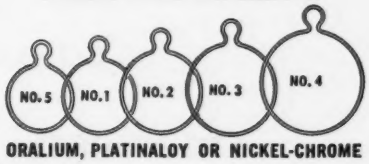

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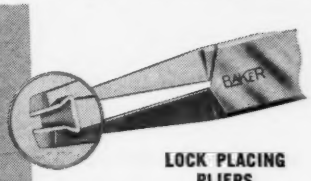

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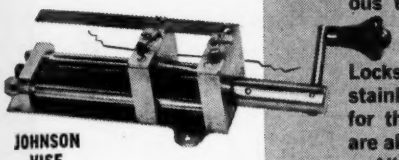

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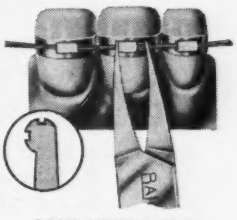

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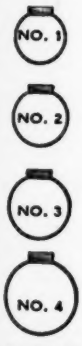

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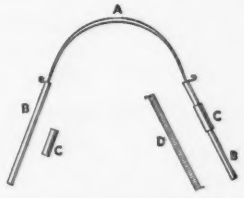

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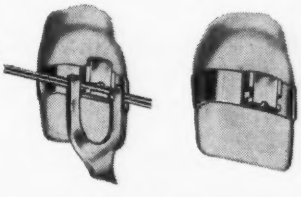

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Cecil G. Muller, Omaha, Nebraska, vice-president of the American Association of Orthodontists, 1960-1961

American Journal

of

ORTHODONTICS

VOL. 46 SEPTEMBER, 1960 No. 9

Original Articles

PRESIDENT'S ADDRESS, AMERICAN ASSOCIATION OF ORTHODONTISTS

C. EDWARD MARTINEK, D.D.S., DETROIT, MICH.

WE ARE very happy to have the American Association of Orthodontists meet in Detroit, the first time that we have been thus honored in fifty-two years. Especially welcome are the young men who are either students of orthodontics or have recently entered our phase of health service. We encourage their presence here, for they are the future of our speciality.

During our annual session in New Orleans, Dr. Broussard, then president of the American Association of Orthodontists, said that our Association should participate in the annual session of the Fédération Dentaire Internationale to be held in New York City Sept. 12 to 19, 1959. We have followed through on that directive, consulting with the chairman of the Fédération's Orthodontic Section, Dr. William Root, and with Dr. Percy T. Phillips, president of the American Dental Association. Both have been assured that we are willing to cooperate and that we are standing by should they desire the assistance of our Association.

During the past several annual sessions of the American Association of Orthodontists, there has been considerable discussion relative to eligibility requirements for membership in our Association and for associate membership in constituent societies. The constitution was revised to provide for the one, and resolutions were approved to provide for the other. The resolutions were parts of the report submitted by the Admissions Committee, and then the Admissions Committee, having completed its work, was dissolved.

Many have felt that members as a whole should be given assurance that there is proper handling of the associate membership and preceptorship issues

Presented before the fifty-fifth annual meeting of the American Association of Orthodontists in Detroit, Michigan, May 4, 1959.

at the constituent society level. Toward that end, those who are intimately identified in the various constituent societies with eligibility and admissions qualifications were asked to meet here in Detroit to compare notes and assure the Association that the directives previously arrived at are being followed in the intended spirit. They met yesterday afternoon under the chairmanship of Edgar Baker. I am sure that the Association will eagerly await and understand this progress report when it is given at this meeting.

Among other matters referred by the past administration to the present one was a suggestion that some study be given the architectural framework of our organization. This I have done, with the conclusion that it may be appropriate to undertake some alterations.

There have been some committees for whose services there has been little call in recent years. It appears that there is reason to consider the question of whether these committees should be continued or abolished.

One of these is the Judicial Council, which is an elected committee. This committee has needed to report very little in the last several years, and it is conjectured that its responsibilities should be placed on a constituent level. In a measure, the responsibilities of the Judicial Council overlap the duties of the Laws and Infractions Committee, and it must be pointed out that here is another committee which has been relatively out of work for quite a period of time.

The Relief Committee is to be considered among the rather unemployed committees, and it is respectfully suggested that consideration be given to whether this committee should be continued.

Further, I am quite convinced that the duties of the Convention Planning Committee and those of the Program Manual Committee should be united within the sphere of one committee preparing for our annual sessions. Mechanics of establishing such a committee would be difficult, but they could be resolved.

Other centers of responsibility, such as officers and committees, have tremendous call for their services, with very little overlapping. I shall give you a few samples demonstrating the amazing activity within this Association.

The American Board of Orthodontics has been in session for the entire past week, examining those of our members who aspire to certification. The Board job is a sustained one which knows no "vacation period." From session to session, it is busy formulating policy, screening applicants who would like to take the examination, and reading thirty or more theses per year submitted by those who hope to become diplomates. Interspersed are thousands of letters which the Board sends out annually in answer to greatly diversified questions that come to it from all parts of the world. The Board president, William R. Humphrey, its most resourceful secretary, Wendell L. Wylie, and the other highly dedicated directors continue to perform quietly their immense tasks in a most distinguished manner.

The fact that the AMERICAN JOURNAL OF ORTHODONTICS has been published without missing an issue in more than forty-five years indicates that here is

another example of need and demand by our membership. Approval of management is also implied. It must be that the Publications Board, the editorial staff, and the editor in chief, H. Carlyle Pollock, are doing a good bit of work. Since Dr. Pollock has been with the JOURNAL from its inception and is presently planning provocative innovations, it is obvious he is a most inspired editor. I am sure that the proposals which he and the editorial staff are making will be well received, since they deal with a streamlined publication plan.

Boyd Tarpley and his Education Committee have also had a full year. In addition to participating in a conference with the Education Committee of the American Dental Association and the secretary of the Council on Dental Education, this committee, along with the Great Lakes Society of Orthodontists and the W. K. Kellogg Foundation Institute, sponsored an Orthodontic Workshop at Ann Arbor, Michigan. The Workshop lasted the better part of a week and certainly brought into focus many of the important and vital issues of our specialty.

The Second Roentgenographic Cephalometric Workshop will be held this summer, and you should know that your committee has been most active in promoting it. Chairman Jack Salzmann, on behalf of the committee, put in a request for a research grant to the United States Department of Public Health, Welfare and Education. Recently, this grant, in the amount of almost ten thousand dollars, was awarded, and the secretary of the Association has already received the check. I feel that the Roentgenographic Workshop Committee is to be greatly commended for this attainment. It is an unusual point in our history and, as Dr. Salzmann said, "This is the first time in our history that the specialty of orthodontics has gained recognition as being a branch of the healing arts."

Public health matters have attracted much interest from our Association and will doubtlessly attract much more as time goes on. At the moment, Dr. Salzmann and his committee are working with Walter Pelton on a survey of orthodontic care. David Ast has been procured as a consultant. Dr. Ast is director of the Bureau of Dentistry, Department of Health, of the State of New York. The correspondence received from our Public Health Committee this year revealed a surprising amount of activity that was previously suspected but not actually known by me until recently.

Last fall I represented our Association at a meeting in Washington, D. C., and only then did I realize the immensity of the task of Dr. Salzmann's committee. The meeting was called by Secretary Flemming of the United States Department of Health, Education and Welfare. At this meeting Secretary Flemming explained that he was attempting to gather facts upon which to base the budget that he was to submit for his department to the President. Surgeon-General Burney advised of the three major areas and the collateral areas in which Secretary Flemming was interested. From then on, the meeting was conducted on the workshop pattern. At the conclusion of the meeting it appeared that I should urge this Association to become alert and more

activated in our efforts in the field of public health. Drs. Salzmann, Oliver, Johnson, Higley, and Kessler must be fortified by the awareness of your keen interest in this field.

In leaving this subject, I must say that I was proud that the American Dental Association was represented with dignity and skill by President Percy T. Phillips. Though I noted that other specialty groups in dentistry had been invited to participate, only our specialty responded.

It is not my intention to go on and on through our committee structure. While I thank those named and unnamed, my present purpose is to present evidence of the vast responsiblilities assumed by members who are at the same time engaged in the private practice of orthodontics. If the foregoing is not sufficiently convincing, I offer two additional items:

Some months ago I visited the offices of our most capable secretary-treasurer, Earl Shepard, in St. Louis. His office consists of a comfortable room of rather adequate size, nicely appointed with two desks (one for his secretary, the most capable Miss Pat Kerr). We looked at the filing system and other records and equipment. I was most highly impressed with the amount of work required daily throughout the year. The obvious question was, "How is one individual able to do all this and conduct a private practice in orthodontics at the same time?"

The same question may also be asked about those who attempt to produce the annual session of our Association. Fresh in my mind are the tremendous efforts of Scott Holmes, program chairman; Robert Coleman, local arrangements chairman; Frank Cartwright, local treasurer; Edward Cheney, limited attendance and table clinics; George S. Harris, banquet and entertainment; Barnett Malbin, commercial exhibits; James Teetzel, registration; and the many others involved in general and specific properties, badges, printing, signs, tours, etc.

That the members of this Association are eager to pitch in and work is undeniable; however, much of the system is too exacting on our members, wasteful, and unfair. It is time to make for a more efficient organization, such as we did when we obtained the services of our indispensable recorder, Mrs. Augusta Grimm.

Growth of the American Association of Orthodontists is such that it is getting beyond the orthodontist in private practice to try to take care of the many executive details involved in our annual administration. We are even outgrowing hotel facilities in many parts of the country. Help is needed, and I suggest that we act toward procuring the services of an executive secretary, as recommended by our Board of Directors in 1958.

Following the last annual session I studied at some length the matter of procuring an executive secretary. I observed that the study was becoming so involved that if I were to continue it I would not be able to take care of very many other duties as president. Accordingly, I decided to have the matter investigated completely and asked William Brandhorst of St. Louis if he would assume that responsibility. He agreed and has made a thorough study. He is prepared to submit a broad report at this session.

There are other problems of importance. For instance, I am of the firm opinion that we are in need of improvement in our relations within the specialty of orthodontics itself and with the American Dental Association and certain specialty groups within the American Dental Association. Furthermore, there is need for improvement in our relationship with other branches of the healing arts and with the public.

This is no criticism of our current Public Relations Committee, which has been conducting itself admirably according to the usual accepted policies of the past. It is my belief, however, that we must expand our horizon. It may well be that our specialty should give serious consideration to retaining a professional expert in public relations.

Furthermore, there is great need for a professional convention manager. Many other professional groups are surprised to find that our Association does not have an executive secretary, a professional public relations agent, and a convention management company to handle the matters stated above. The American Academy of Pediatrics, which is only twice the size of our Association, has all three. Moreover, it has a paid lobbyist. In addition to that, it has its own building in which the staffs and records of the Academy are housed and office procedures are conducted. I am further reminded that the Custom Tailors and Designers Association of America, consisting of about 300 or 400 members, has nearly all those conveniences too. If a small organization of that sort is able to conduct itself on such an efficient basis, the American Association of Orthodontists should be able to do likewise.

The final matter in the present report is included for your information and to get it into the records of this Association.

Following the last annual session of the American Association of Orthodontists I received a confidential letter from John W. Ross of Philadelphia, in which he told me that there was some prospect of Mrs. Mershon establishing a trust to honor the memory of her late husband.

Shortly after this a letter was received from Mr. Norman E. Walz, assistant vice-president of the Provident Tradesmen Bank & Trust Company in Philadelphia, in which he asked for an opinion regarding the proposal by Mrs. John V. Mershon. The Ad Interim Committee was consulted with reference to that opinion and agreed that it had the right to accept this trust, and I was authorized to go ahead and consummate it.

Through much correspondence between that date and last September it became evident that we were nearing completion of the details of the trust fund to be established. I notified both Mrs. Mershon and the trust company that I would be happy to go to Philadelphia and help finalize the matter. Accordingly, on Tuesday, November 25, I went to the Provident Tradesmen Bank & Trust Company, where a meeting was held between Mrs. Mershon, Mr. Walz, Mr. Richard Reason (Mrs. Mershon's attorney), and myself. The first draft of the trust was drawn up at this meeting and contained, in part, some of the following conclusions: It was agreed that the trust would establish in perpetuity a memorial to the late Dr. John V. Mershon. The

trust would involve a certain amount in cash and other securities amounting to about $20,000.00, which would yield an income of approximately $500.00 annually. The income from the trust would be used to pay an honorarium and expenses for a lectureship to be known as the John V. Mershon Memorial Lecture. The annual yield from the trust would be paid to the secretary-treasurer of the American Association of Orthodontists in April of each year following the year 1959. It is not necessary for the full amount of the income to be expended each year. Any amounts left unspent during one year may, at the discretion of the Committee, be used in any other year.

The John V. Mershon Memorial Lecture will be given at the annual session of the American Association of Orthodontists and will deal with the subject of orthodontics. A broad interpretation of the word "orthodontics" will be understood, so that the lectureship may deal with collateral fields of orthodontics. The committee which selects the person to deliver the John V. Mershon Memorial Lecture in a given year will consist of the president of the American Board of Orthodontics, the president of the American Association of Orthodontists, and the Program Committee chairman. The intent of the last is that the president of the A. B. O., the president of the A. A. O., and the chairman of the Program Committee be those persons who will be occupying such offices during the particular annual session for which the selection is being made. It is stipulated that no amount of the principal may be used at any time. The first John V. Mershon Memorial Lecture will be available for the next annual session of our Association.

The deed of trust was executed by Mrs. Mershon just before she left for Florida in December, 1958. I am most reluctant to report to those of you who may not have heard that a few days later she passed away. Word that this charming lady had died was received with a great deal of sadness.

At our meeting in Philadelphia, when the preliminary details were being brought into final form, Mrs. Mershon asked me if I, personally, would deliver the executed deed of trust to the American Association of Orthodontists. Now, in behalf of the charming and dutiful Mrs. Mershon, I present to the American Association of Orthodontists the deed of trust which creates in perpetuity a memorial to her most beloved husband, the late John V. Mershon.

CEPHALOMETRIC SYNTHESIS

An Exercise in Stating Objectives and Planning Treatment With Tracings of the Head Roentgenogram

Robert Murray Ricketts, D.D.S., M.S., Pacific Palisades, Calif.

INTRODUCTION

IN ORTHODONTIC treatment planning the assumption is usually made that teeth will move, that the patient will grow, and that the clinician can accomplish a desired result with his specific therapy. Broadly speaking, the orthodontist is predicting the outcome of the patient's treatment. With the full realization that treatment planning constitutes a prediction, the clinician should be more critical in estimating results rather than leaving growth and change to chance alone. When facial disproportion and ugliness prevail, it is important to recognize facial form in addition to occlusion as a problem in contemporary orthodontics. The necessity for an estimation of changes becomes apparent when the possibilities of tooth movement and facial change are recognized. One needs only to observe and understand the changes that occur during treatment in order to appreciate the importance of dynamic factors.

Cephalometric roentgenology has been the tool used to evaluate morphology* and to study growth and change during treatment.[2, 7, 22, 24] It naturally follows that this tool should also be employed for estimating the future behavior of jaw growth and development of occlusion. The result of such a technique is a sort of "cephalometric blueprint" of the conceived image. We have termed this method "cephalometric synthesis," which indicates a putting-together of isolated factors.

Natural growth of the skeletal bones comes to mind first when estimations of the future are being made, but its alteration with treatment must also be considered. The possibilities of tooth movement, anchorage values of tooth units, and resulting adaptation and growth of soft tissue are likewise essential factors. Therefore, growth is only one part of the total change to be estimated

Based on papers read before the Pacific Coast Society of Orthodontists, Feb. 25, 1958, Santa Barbara, California; the Chicago Orthodontic Society, March 23, 1959, Chicago, Illinois; and the Southwestern Society of Orthodontists, Oct. 6, 1959, Houston, Texas.

*The reader is enjoined to familiarize himself with the publication, "A Foundation for Cephalometric Communication"[22] in order to appreciate and understand the interpretation of cephalometric headfilms prior to engaging the x-ray for the present theme. Certain basic information must otherwise be assumed. In addition, the reader should be acquainted with facial alteration and the possibilities of treatment given in my article entitled "The Influence of Orthodontic Treatment on Facial Growth and Development."[23]

in treatment planning. The estimation procedure has thus been divided into "static synthesis" for those cases in which growth is not expected and "dynamic synthesis" for cases in which the advantages of growth are to be enjoyed.

If a clinician does not particularly care where he moves teeth, or if he has only a passing interest in esthetics or permanent results, placing all his confidence in late growth and retainers alone, then synthesis probably has little interest and little value for him. However, the clinician who is interested in the most expedient and efficient treatment technique or the operator who is mindful of ultimate functional and esthetic balance and harmony of the teeth, mouth, jaws, and face should have a lasting interest in a synthesis procedure of this or another type, depending upon his discipline.

To apply the synthesis procedure, it is often necessary to state rather critical treatment objectives in order to be sure of "where you want to go." Only then can specific treatment be prescribed. Herein, however, lies a basic danger. The limits of ideal or satisfactory results must be identified and applied to the individual case. The dictates of common sense must be obeyed.

At the clinical level this procedure yields a rough estimate of conditions most likely to occur. Therefore, it should be considered a guide or an aid in the selection of the most intelligent and practical course to take in treatment planning. It still is subjective on the basis of previous experience with similar cases, but it permits a keener insight into the *possibilities* of an orthodontic case. It does not prevent mistakes in judgment, but it reduces the element of chance. It is intended as an addition to other cephalometric procedures, especially for difficult cases.

THE "STATIC SYNTHESIS"

When no change in basal relationship is expected, the clinician is permitted to use a "static" method of planning tooth changes to the skeleton. Thus, the growth phases of the synthesis may be omitted. Changes can sometimes be anticipated as a result of displacement problems or loss of vertical dimension, but usually these are minor.

Some clinicians advocate setting up the teeth in plaster for a treatment plan. However, a "cephalometric setup" can be made with less effort and in less time. A formula for tooth arrangement can be employed in this instance, since growth and changes in basal relationships are unlikely, except for slight changes at points A and B.

The teeth can be moved in the mind's eye on the film, or, they can be moved in the original tracing. Both procedures confuse the picture and render it difficult to evaluate later. For this technique, ideally, a copy is made of the original tracing, excluding the teeth and soft tissues. In Fig. 1, a case of severe Class II lip-sucking with retracted lower arch is contrasted to a case of severe crowding and protrusion in which no growth is taking place. We shall call these patients Robert and Ann, respectively.

Reference Planes for the Teeth (APog Plane and Occlusal Plane).—The fundamental points employed are points A and pogonion (the APog plane).

This plane has been termed the "denture plane," since it connects the anteriormost basal bone structures of the upper and lower jaws. In some cases, 1 or 2 mm. of change in point A can be expected following vigorous lingual root movement of the upper incisor. In the new tracing (Fig. 1, *C* and *D*), a

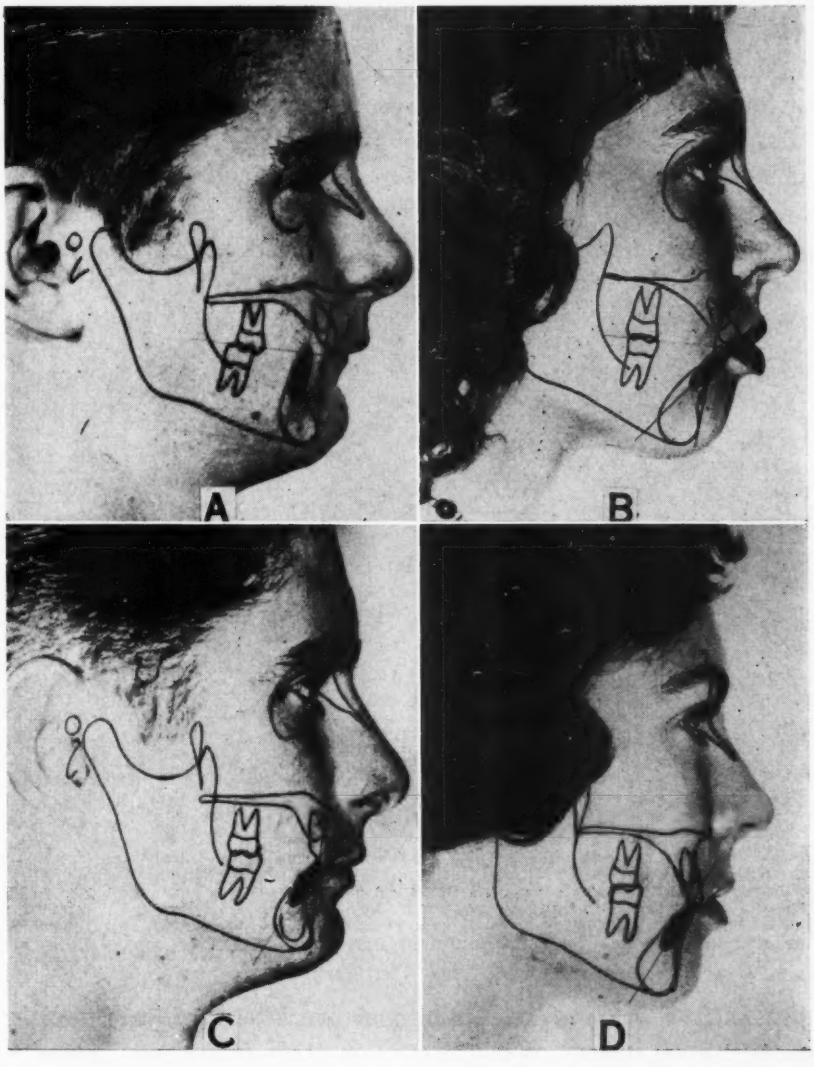


Fig. 1.—Tracings of cephalometric roentgenograms superimposed over photographs. *A*, Severe Class II in malocclusion well-developed boy (Robert). Note mandibular arch retraction and sublabial tension in the mouth (lower incisor is −7 mm. from the APog plane). *B*, Severely crowded and prognathic Class I malocclusion in Ann (lower incisor inclined forward and located +8 mm. to the APog plane). *C*, Robert's tracings after treatment. Note that the position of the lower incisor is now almost on the APog plane. Compare with treatment plan shown in Fig. 2. *D*, Ann's tracings after treatment. The lower incisor was retracted almost to the APog plane.

new APog plane is erected for the purpose of tooth profile reference. The *occlusal plane* is drawn near the original line of occlusion of the buccal teeth (although it changes, according to my earlier findings[10, 11]). The teeth are then placed in an ideal reciprocal relationship to the basal bones *for that*

depending upon the clinician's ideas on lip and tongue function, the best tooth position for ultimate stability, and the best compromise for esthetic requirements.[7]

Lower Incisor—Location and Position.—When the APog plane is employed as a reciprocal reference plane, the tip of the lower incisor is adjusted, if thought possible, to lie within one standard deviation of the natural variation as described by Downs[9] and by me.[22] The lower incisor sensibly should be 1.0 mm. forward to 1.0 mm. backward of the APog plane. One standard deviation of 1,000 orthodontic cases was 2.5, which ranges from –2.0 mm. to 3.0 mm. as satisfactory. I feel obliged to locate the lower incisor within this range if humanly possible within compatible principles of longevity of the denture. It is indeed a rare case in which this is impossible. The cases shown in Fig. 2 were anticipated on each side of the mean with respect to original environment of the denture.

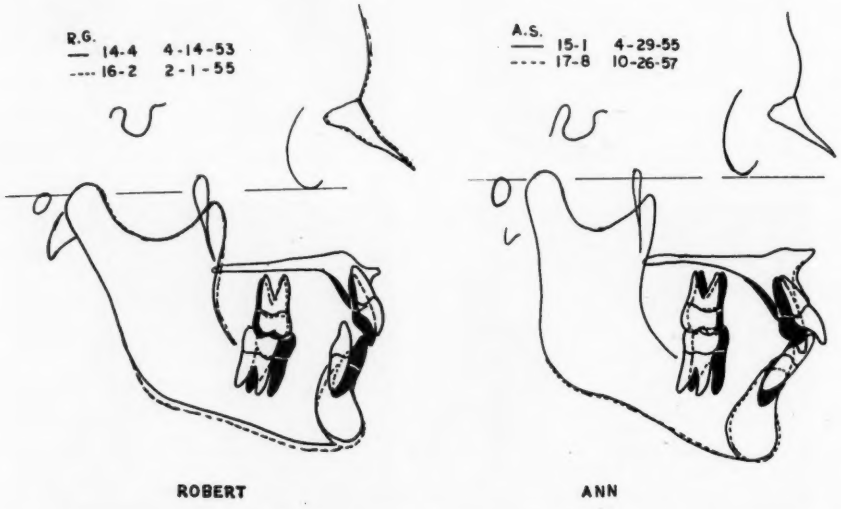


Fig. 2.—Treatment plans and results for Robert and Ann. Note the needed change in the lower incisors corrected to lie within one standard deviation of the mean, which is +0.5 ± 2.5 mm.; the anticipated forward bodily movement of the lower molar in both cases; the needed slight drift of the upper molar in Ann's case; and the backward movement in Robert's case the only corrective force was provided by intermaxillary elastics. In Ann's case, a palatal holding arch and extraction of four first premolars were employed for treatment.

Upper Incisor Angulation.—A normal overbite and overjet are then "set up" for the upper incisor, depending upon what is desired. Thus, the upper incisor angulation is determined only after that deemed desirable for the lower incisor. The interincisal angle is up to as high as 145 degrees in the adult case, with the average near 135 to 140 degrees. The relationship deemed possible, sensible, and practical should be established. By comparing the original tracing with the "setup," one can readily see the needed change in relationship of the upper incisor.

Anchorage Factors.—The extent of tooth movement necessary in the anterior portion of the denture predetermines the anchorage needed to accomplish that change. Molar and posterior anchorage can be estimated with experience.

The lower arch moves forward 3 to 4 mm. in ordinary Class II treatment with extraction. (See Table III, Group 4.) The possibility of extraoral anchorage can be evaluated for the specific patient. The selection of holding arches and extraction patterns becomes evident. Thus, a treatment plan can be established on the objectives as outlined by needed changes in the incisors (Fig. 2).

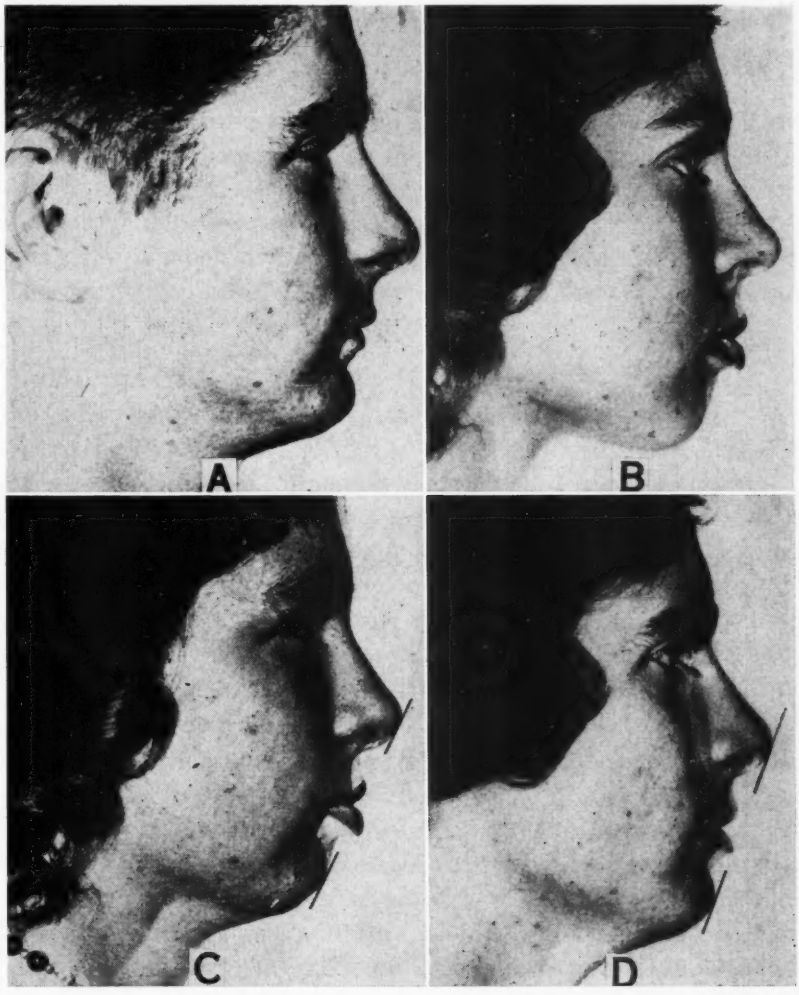


Fig. 3.—Esthetic and functional changes in superimposed photographs on "E" plane. *A*, Note the forward movement of Robert's lower lip. Thickness of the lower lip did not change appreciably. *B*, Note retraction of both of Ann's lips but slightly more reduction in lower lip. The upper lip is thickened slightly. *C*, Photographs of both patients superimposed, before treatment, on the esthetic plane (nose to chin). Note the differences in the mouths of these patients as effected by tooth relationship. (Refer to Fig. 1.) *D*, Photographs superimposed, after treatment, on the "E" plane. Note better lip balance and harmony of the mouth with the nose and chin. (Refer to Fig. 1.)

Lip Change and Esthetic Objectives.—The upper lip will thicken slightly following retraction of the upper incisors (1 to 2 mm., depending on strain in the beginning). The lower lip will "curl" backward or forward, meanwhile maintaining about its same thickness, depending upon tooth change (Fig. 3, *A* and *B*). The sublabial area below the lower lip usually maintains its thickness

TABLE I

GROUP*	GROUP SAMPLING: AVERAGE AGE	DURATION (MONTHS)	SEX: MALE	SEX: FEMALE	CRANIAL BASE: SN	CHANGE	@ YR.	SBA	CHANGE	@ YR.	NSBa	CHANGE
I. Untreated Class I	8.1	30	21	29	68.5	2.4	0.9	40.8	2.8	+0.9	128.8	+0.14
II. Untreated Class II Division 1 (24) Division 2 (26) Retro (19) Pro (18)	8.1	30	22	28	69.2	2.5	1.0	42.5	2.1	+0.8	129.6	0
III. Treated Class II, extraoral Division 1 (36) Division 2 (10), Class I (4) Retro (13) Pro (17)	8.8	27	22	28	69.1	2.2	1.0	43.1	1.6	+0.7	130.8	−0.3
IV. Treated Class II, intraoral Division 1 (29) Division 2 (21) Retro (15) Pro (12)	11.7	30	20	30		2.0	0.8		1.4	+0.6		
V. Treated Class II, compound Division 1 (36) Division 2 (14) Retro (12) Pro (14)	11.0	33	28	22	71.3	2.3	0.8	45.8	1.86	+0.6	129.7	+0.3

*Each group consists of fifty cases.

(Fig. 3, *C* and *D*). Thus, the lip tissue anterior to point B will follow the behavior of the root of the lower incisor. If a mentalis habit exists, relaxation of the mentalis muscle will follow retraction of the denture *unless the face is extremely long and the lips are short.* Therefore, in nearly all cases the distribution of the soft tissue of the chin over the symphysis will change as the teeth are moved (Figs. 3 and 17).

If growth is not contemplated, the nose probably will change very little. Therefore, a review of the esthetic changes by viewing the esthetic plane (end of nose to chin) will indicate the probable esthetic results.

It should be emphasized that static synthesis, or a formula for treatment, is possible only in conditions in which no growth is anticipated. One standard deviation of natural variation from the mean of the lower incisor is sought clinically. Similar denture relationships do not take away autonomy (Fig. 3). Each case maintains much of its individual characteristics in spite of attempts to bring the teeth into a rather limited concept of esthetic balance and functional harmony.

THE DYNAMIC SYNTHESIS

When growth and change in the relationship of parts are anticipated, the synthesis must be dynamic. The greater the conceived change, the more important the recognition of an estimation procedure. I have previously described a "long method."[20] My technique was established on the basis of findings made on fifty treated Class II cases and other growth observations made from laminagraphy of the joint. It was approached through the vital cranial base and mandibular joint. It led to a vast understanding and explanation of the changes in facial relationship, but the knowledge required for its use was too large for many clinicians to grasp. In this paper, therefore, I propose a simplified technique based on recent findings of current treatment procedures.

In order to obtain information on the morphologic variation to be experienced in practice, I studied 1,000 clinical cases.[22] Various indicators were employed to analyze the cephalometric tracing. Means, ranges of variation, and standard deviations were established for facial height, depth, and convexity. Likewise, the relationship of teeth and soft tissue arrangement were subjected to analysis. These data were divided into age groups and studied for suggestions on growth but, of course, this was not true longitudinal research. Accordingly, a serial study was needed and was conducted.

Study of Growth and Treatment.—Serial cephalometric records were accumulated on five groups of patients; there were fifty patients in each group, making a total of 250 cases (Table I). There were two groups of nontreated cases and three of cases that had been treated. In the nontreated samples, there were fifty Class I cases and fifty Class II cases. The three treated samples, all Class II, were corrected by extraoral anchorage, intraoral anchorage, and a combination of these forces, respectively.

Each case was subjected to sixty-three computations. Certain groups were subdivided as to age, sex, facial type, and malocclusion. The components

TABLE II

	MANDIBLE								MAXILLA					
GROUP	FACIAL ANGLE	CHANGE	XY AXIS	CHANGE	NSGn	CHANGE	MANDIBULAR PLANE	CHANGE	SNA	CHANGE	SN-ANS	CHANGE	PALATAL PLANE	CHANGE
I	86.1	+ 1.2	3.6	− 0.04	67.1	+ 0.4	25.7	− 0.4	80.6	+ 0.5		+ 0.6	6.6	0.01
II	84.0	0.8	2.4	− 0.3	68.4	+ 0.2	27.7	− 0.6	79.6	+ 0.3		+ 0.6	7.6	+ 0.2
III	85.0	0.5	3.5	− 0.9	67.7	+ 0.7	25.6	+ 0.5	82.5	− 2.7		− 1.3	6.2	− 1.3
Retro	82.2	0.8	.5	− 1.0			28.9	1.0						
Pro	87.7	0.1	6.3	− 1.0			22.4	0.4						
IV	84.7	0.7	2.7	− 1.0		+ 0.72	24.1	+ 0.7		− 0.9		− 0.1		
V	86.0	1.3	3.3	− 0.3	67.7	+ 0.4	23.3	− 0.8	82.7	− 3.1		− 1.8	6.4	+ 1.3

TABLE III

	LOWER INCISOR				UPPER INCISOR				MOLARS		PROFILE		
GROUP	MANDIBULAR PLANE AT POGONION	CHANGE	APog PLANE	CHANGE	SN	CHANGE	APog PLANE	CHANGE	MANDIBULAR PLANE AT POGONION	PTM AT FH	POINT A TO FAC.	CHANGE	ANS TO NOSE
I	− 8.9	− 0.98	1.2	0.42	82.4	1.3	4.0	0.9	0.25	+ 3.5	2.7	− 0.3	2.2
II	− 9.0	− 0.4	− 0.7	+ 0.5	81.2	+ 0.7	5.1	0.8	0	+ 2.0	4.5	− 0.4	2.6
III	− 7.9	− 1.4	− 0.3	+ 1.2	84.4	− 3.4	6.9	− 3.2	0	− 1.3	5.8	− 3.0	2.5
											7.8	− 3.6	
											4.5	− 2.9	
IV		+ 2.0	− 1.2	+ 2.8		− 1.8	5.8	− 2.3	1.6	+ 1.3	4.0	− 1.2	2.5
V	− 8.2	− 1.0	− 0.6	+ 1.2	85.4	− 4.1	7.5	− 4.5	1.1	+ 1.2	5.1	− 3.8	3.5

studied could be classified as cranial base and upper face (Table I), mandibular or lower face (Table II), maxillary or middle face (Table II), change in dental relationship (Table III), and soft tissue growth of the face (Table III).

Details of this study are too large to be included here. Certain data, however, are pertinent to the synthesis procedure herein outlined and are therefore summarized in the accompanying tables. These findings, together with other data of past studies, are offered as documentation for the authenticity of the prevailing tendencies described in the procedure.

Sequence of Steps in the Dynamic Synthesis.—Since growth and mandibular change must be related from cranial landmarks or references, the foundation for synthesis obviously must be made in certain cranial points and planes of reference.

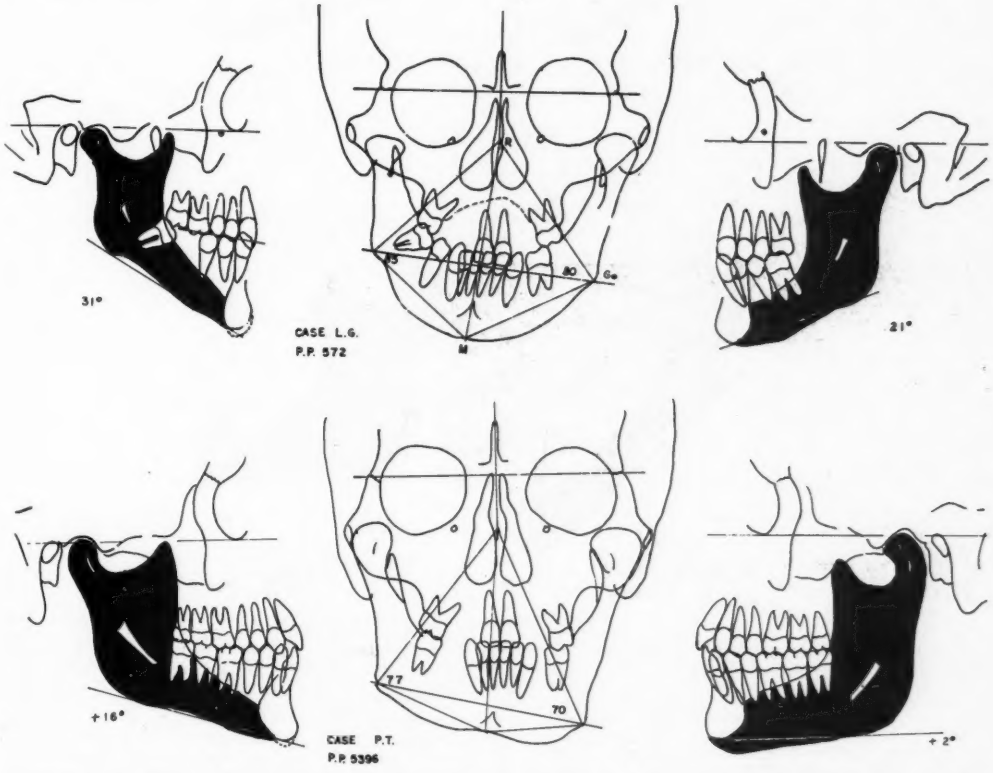


Fig. 4.—Two cases of unilateral growth problems in the mandible, both with midlines to the left studied with laminagraphy. In Case P. P. 572 there is undergrowth on the left side while the right side is normal. Note the short, narrow condyle head inclined posteriorly on the affected side as seen in tracings of the left joint. Note also the high mandibular plane angle of 31 degrees on the left, consistent with condyle undergrowth. In Case P.P. 5396 the mandible is normal on the left side (mandibular plane, 16 degrees). Note on the right side the thick long condyle head inclined forward and condyle overgrowth. Note also the low mandibular plane angle consistent with condylar overgrowth (+2 degrees). Comparisons of these mandibles are seen in Fig. 5. The form of the mandible in the frontal tracing is expressed at angle formed by *R-Go-M*. *R* is the registration on midsagittal plane between foramen rotundum; *Go* is the gonial angle; and *M* is menton or lower border of the symphysis.

Past research has suggested that the mandible is the most important determinant of facial morphology.[18, 19, 21] Thus, in estimating facial change, the *future growth of the mandible* should be of primary concern. Changes in

the *chin* merely reflect changes elsewhere in the mandible and in the glenoid fossa. Therefore, a critical consideration of mandibular patterns is important (Figs. 4 and 5).

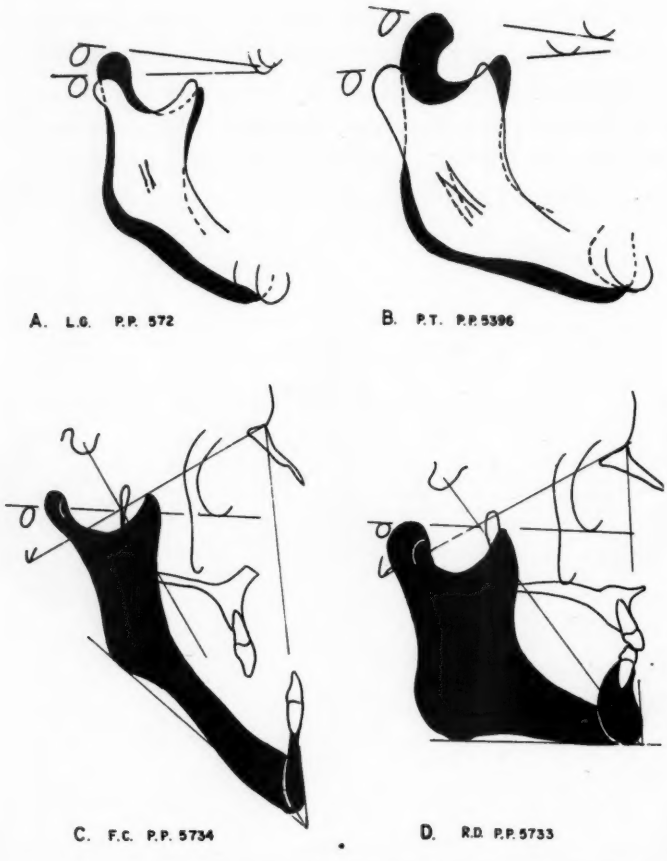
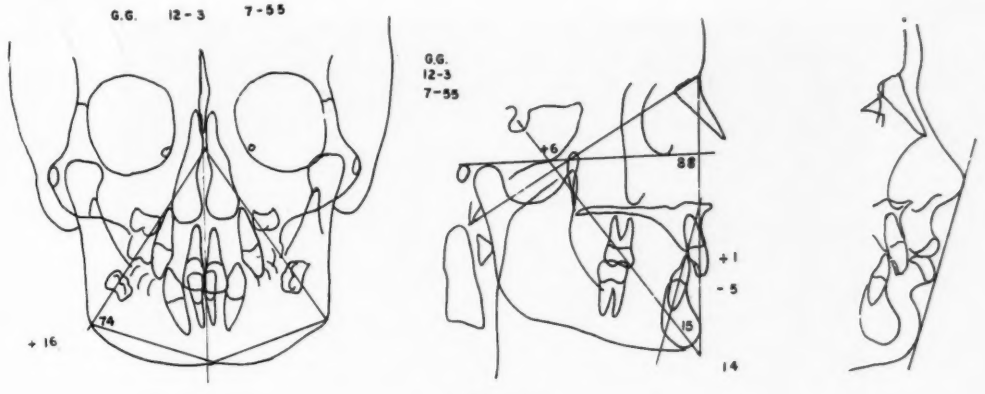


Fig. 5.—Mandibular growth phenomenon. *A*, Laminagraph tracings of right and left sides in Case P.P. 572 superimposed on the mandibular foramen and symphysis. (See Fig. 4.) Note undergrowth of the gonial angle and difference in ramus height. *B*, Same comparison for Case P.P. 5396. Note that the overgrowth of the gonial angle reflects the overgrowth of the condyle. This kind of case often is classified as a chondroma, but the diagnosis usually is not confirmed at biopsy. *C*. Head-plate tracing of true Class III mandible. Note narrow condyle, ramus, and symphysis. Note long condyle and body. *D*, Head-plate tracing of short prognathic close-bite case. Note square mandible, low mandibular plane, thick condyle, symphysis, and ramus, and overdevelopment of the angle. Clinical impression of very strong muscles is witnessed in attrition of the anterior teeth almost to the gum line.

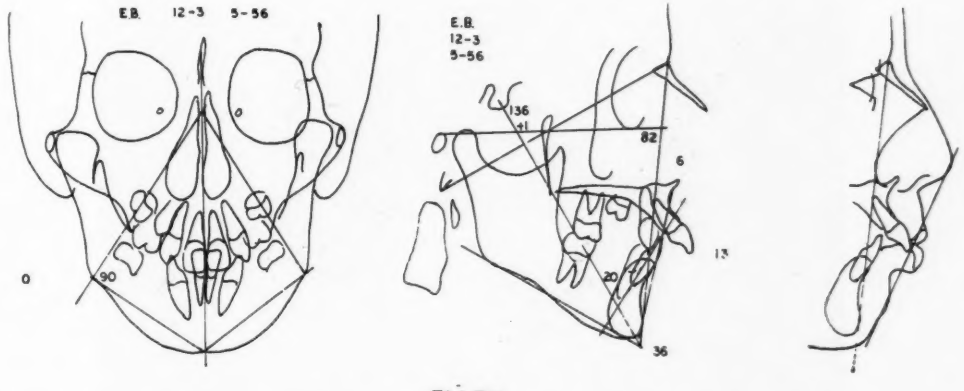
Although natural growth change is less dramatic in variation in the upper jaw than in the lower jaw, changes in the middle face are vital to an estimation procedure. Recent findings have suggested that the basal bone of the maxilla is amenable to alteration by orthodontic manipulation, and the possibilities of these changes must therefore be recognized.[21]

Recent studies further indicate that the teeth can be moved safely over greater distances than previously thought possible.[25] Therefore, attention to

anchorage preparation,* torquing of teeth, and mechanics of manipulation is also a general consideration in cephalometric synthesis in addition to estimation of growth.



GILBERT



ELLEN

Fig. 6.—*Above:* Before-treatment records on Gilbert, a 12-year-old boy with a Class II, Division 2 malocclusion. There is crowding in both arches. Note strong mesognathic and brachycephalic straight pattern, retruded lower denture, and good lip relationship. This patient had excellent growth potential on the basis of sex, age, facial pattern, and physical characteristics. Width of mandible is expressed at R-Go-M angle (74 degrees). Growth estimation and plan are shown in Figs. 9 to 13.

Below: Before-treatment records on Ellen, a 12-year-old girl with a severe Class II, Division 1 malocclusion. There are severe lip strain and a mentalis habit. Note retrognathic and dolicocephalic pattern with high convexity. There is severe maxillary incisor protrusion. The lower denture is harmonious with the APog plane, but the APog plane is inclined forward. Crowding is present in lower arch. Thickness of ramus is on the plus side, but disposition of the mandible is less favorable. Note the narrowness of the mandible (R-Go-M = 90 degrees).

Finally, even less attention has been paid to the changes in the soft tissues of the profile and the adaptation of the structure of the tongue. Therefore, estimation of growth of the nose, thickness of the lips, and change in the integument of the chin must be considerations for the case that requires esthetic improvement.

*At this writing I do not concur exactly with the system or philosophy of anchorage preparation as advocated by Tweed[27] and his followers.

An estimation of growth for a two-year period is usually outlined, although some cases may be projected only one or up to three years. This is done because it should require about one and one-half to two years of care to get a case into retention following the initial records and because time is needed for the

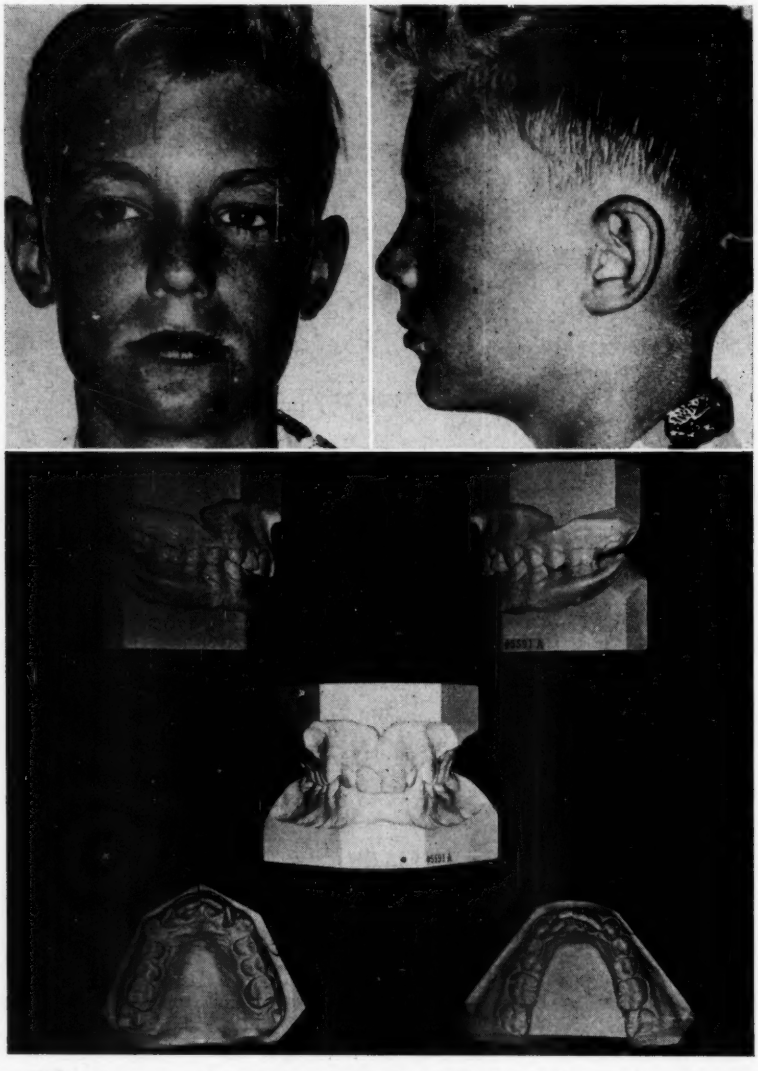


Fig. 7.—Before-treatment records on Gilbert. Photographs show a symmetrical face with maybe slight strain in oral function. Note early canine furrow. Lips are balanced and contained within the nose-chin line. Models show a Class II, Division 2 malocclusion with deep bite and high cuspids. Note severe rotation of lateral incisors and crowded lower arch.

patient to receive the benefits of growth, especially when extraoral anchorage is employed. Fifty consecutive cases that I completed in 1957 averaged almost twenty-four months in treatment. (Some clinicians advocate much quicker treatment.) In addition, an estimation procedure should include a concern for growth and change during retention. These changes are therefore of importance in the "cephalometric setup" of the teeth.

The principal features of the estimation procedure will be discussed in case presentations (Figs. 6, 7, and 8). A Class II, Division 2 case in a 12-year-old boy (Gilbert), together with a difficult Class II Division 1 extraction case in a 12-year-old girl (Ellen), will be represented to illustrate the method.

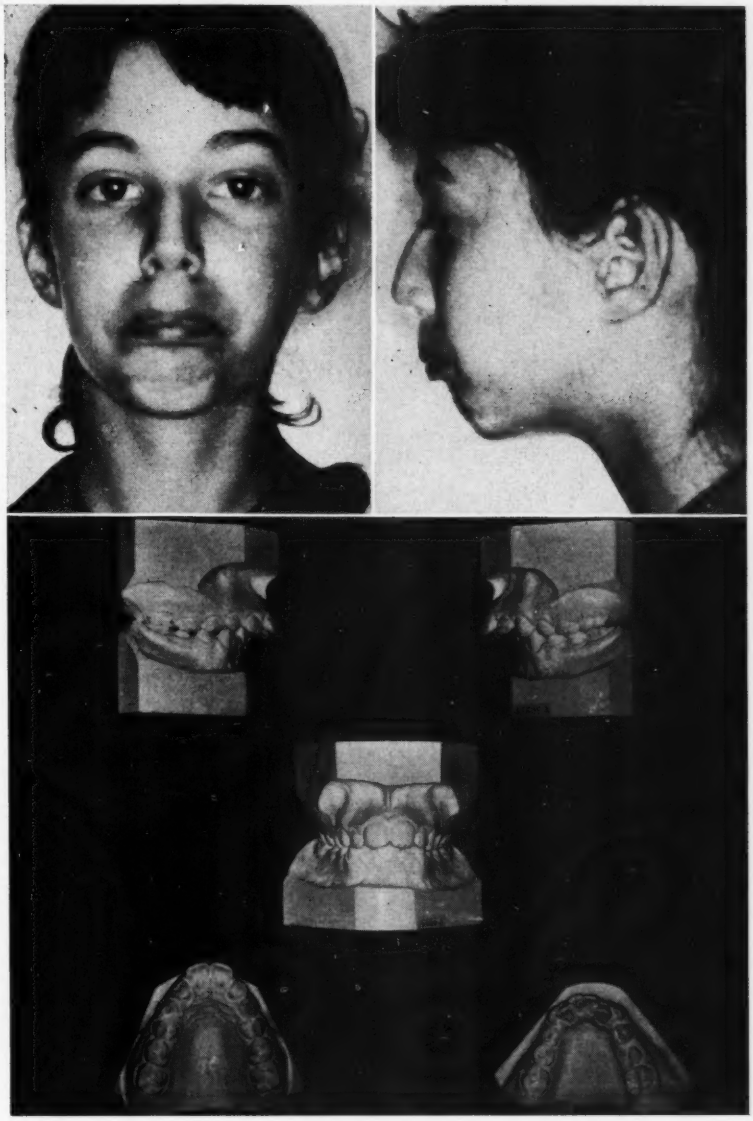


Fig. 8.—Before-treatment records on Ellen. Photograph shows severe lip strain and mentalis habit, as well as narrow dolicocephalic tendency. Both lips protrude well beyond the esthetic plane. Models show severe Class II, Division 1 malocclusion. Note narrow upper arch, crowded lower arch, and retained upper second premolars.

The sequence for a short estimation procedure, therefore, is as follows

1. Establish cranial reference points (Fig. 9).
2. Prognose behavior of the chin (Fig. 9).

3. Estimate changes in the maxilla (Fig. 10).
4. "Set up" the teeth cephalometrically (Figs. 11 and 12).
5. Change the soft tissues of the profile (Fig. 13).

Step 1. Cranial reference (sella nasion plane) (Fig. 9): Björk[3] has published probably the finest serial work on the growth of the cranial base. Brodie[6] has also studied this area, as did I.[17] Moore,[15] however, has stressed the use of the cribriform plate and sphenoid wings as valuable cranial reference points. Björk more recently has suggested the midsagittal floor of the anterior cranial fossa as a reference.

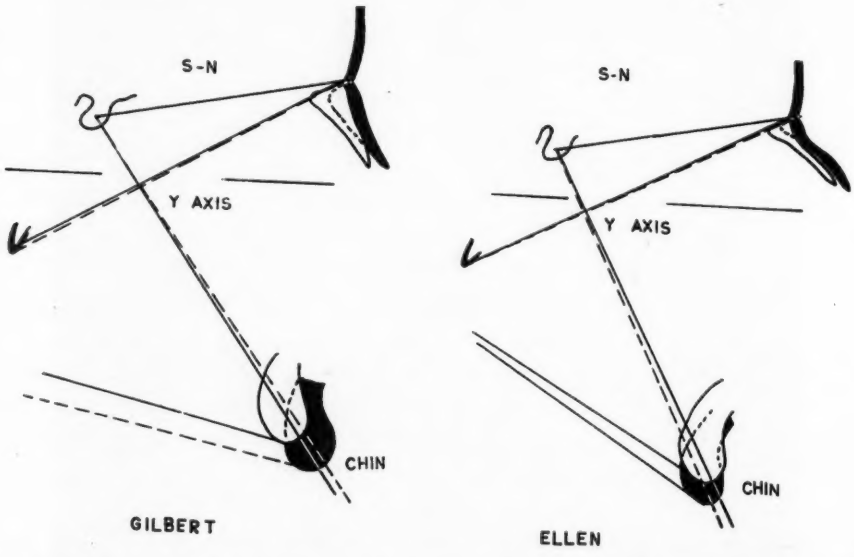


Fig. 9.—Growth estimation of SN, Y axis, and chin. Two-year prognosis for each case. (See Tables I and II.) Gilbert shows a 3 to 4 mm. increase on SN with Y axis closing 1 to 2 degrees. The chin is growing on the Y axis approximately 6 mm. per year. Ellen shows a 2 to 3 mm. increase on SN with Y axis opening 1 to 2 degrees. Chin growing on Y axis 3 mm. per year or a total of 6 mm. (Basion-nasion plane can also be employed for better appreciation of total cranial base registration.) Ba-S increases at three-fourths rate of SN growth. (See Table I.)

Both Brodie[5] and Björk[4] maintain that the SN line constitutes a valuable reference line for serial comparison. Steiner[24] has also utilized this line. Lande[14] corrected the Frankfort plane by use of the SN plane in his studies.

An important consideration with respect to the SN plane is the tendency for forward growth of the maxilla (point A) to parallel the forward growth of nasion. For practical purposes (Table I), the line SN increases in length at the rate of nearly 1 mm. per year at the age most likely to be treated. In girls after puberty (14 to 15 years of age) this dimension increases at about one-half that rate, if at all. In boys at puberty, changes greater than 1 mm. per year have been noted. Therefore, simply placing a new tracing film over the initial tracing and advancing nasion about 1.5 to 2 mm. from point S, depending on the case, will yield a practical cranial reference (Fig. 9). These observations are also consistent with those of Nanda.[16]

Step 2. Change in the chin position (Y axis or SGn) (Fig. 9): The increase in length of the Y axis from S and its change in direction from the SN plane are estimated.

In a study by Moore, reported by Downs,[8] of nontreated Class II cases in the Mooseheart Series at the University of Illinois, the average case showed a 1 degree increase in the SNGN or opening of the Y axis. The results of my subsequent studies on treated Class II cases were consistent with this finding.[19] Klein's[13] study of cases during cervical extraoral treatment revealed that the Gn changes also followed this type of behavior. The studies just mentioned, however, employed slightly different cranial reference lines. In the serial study referred to in Table I the behavior of the XY axis and the Y axis will be noted in the samples of facial types.

Although a 1 degree opening is typical, there are rather dramatic changes in some cases, and these are correlated with facial types (Table II). Preliminary findings have suggested that mechanical manipulation of appliances alters the chin behavior. A factor in this connection is opening or closing of the bite by rotation of the mandible due to elongation or intrusion of the teeth. Certain cases will yield to elongation of molars and the condyle will rotate in the fossa as the bite is opened. Thus, the chin will drop downward as the mandible grows, strictly from the influence of tooth elongation in some cases (that is, opening of the Y axis). My work[19] constituted an attempt to explain the factors responsible for changes in the chin. I concluded that growth of the condyle was probably most important, although bite opening and rotation of the mandible were significant. Other lesser factors were cranial base changes (glenoid fossa) and positional shifts of the condyle during treatment.

Since the mandible is thought to be predominantly responsible for facial form, its growth is of primary importance to change in the face (Figs. 4 and 5). The form of a grown mandible thus is thought to reflect its past behavior and its present tendencies. Therefore, a look at mandibular characteristics is important. The sooner definite identification of these characteristics can be made, the better treatment can be planned. I described mandibular patterns in 1955 and 1958. These distinguishing growth characteristics have been compiled from observations of the normal and from the study of more than 500 abnormal joint cases over the past twelve years. They are as follows:

1. *Mandibular plane angles.* Low mandibular plane angles are often consistent with chins that grow forward (Fig. 4). High mandibular plane angles are usually associated with vertical growth patterns. (See Table I.)

2. *Inclination of the mandibular gonial angles.* "Square" mandibles tend to continue in that shape. Obtuse gonial angles tend to maintain that form, as seen in typical Class III cases (Figs. 4 and 5). The square jaw usually grows forward; the straight mandible tends to grow downward, but not always.

3. *Width of the ramus.* Width tends to be maintained after the age of 6 years. Thus, the thick ramus is usually consistent with square

or brachycephalic growth patterns (Fig. 5). The thin ramus is often consistent with height of the face and dolichocephalic patterns.

4. *Width of the symphysis.* A thick, heavy symphysis is often consistent with a thick, strong, well-formed and forward-growing mandible. Thin dimensions of the symphysis are often consistent with weak mandibles and dolichocephalic patterns (Fig. 5).

5. *Thickness of the condyle head.* Heavy condyles are associated with heavy mandibles. Thick, heavy condyle heads usually are consistent with forward-growing mandibles (Fig. 5).

6. *Inclination of the condyle neck.* Forward growth patterns of the chin are most frequently associated with condyles that are inclined forward (Fig. 4). Conversely, vertical growth patterns are often consistent with condyle heads tipped backward from the ramus. (See Table I.)

7. *Corpus mandibular length.* Long corpora tend to maintain length development to the mandible in all patterns (Figs. 4 and 5).

8. *The coronoid condyle plane (relative condyle coronoid length).* If the coronoid lies high above the condyle when measured from the mandibular plane, the chin is often growing vertically, and vice versa.

9. *Occlusal plane to the mandibular plane.* Squareness or parallelism usually is associated with forward growth. Diverging planes tend to increase as the chin grows vertically.[19]

10. *Excessive notching.* A deep antegonial notch is usually suggestive of growth arrest of the condyle and lack of posterior facial growth.[10]

When all characteristics for vertical growth are combined in one patient, the Y axis might open up as much as 5 degrees in two years. When horizontal tendencies prevail together, the Y axis might close as much as 3 degrees. Reference is further made to the effects of the muscle pattern on bite opening. Heavy muscles often resist mandibular rotation.

The *amount* of growth is often difficult to estimate (Table II), but assuming the average for the *age, sex, physical,* and *hereditary characteristics* of the mandible and the facial pattern will yield surprisingly consistent results. A history of menstruation or voice change is important. Broadly, I have found with laminagraphy[18] that up to and during the mixed dentition age children of both sexes grow about 2 mm. of condyle per year. Translated to facial change with added corpus mandibular growth, the average was 2.5 to 3 mm. per year when studied on the Y axis. (See Table I.) At puberty (12.5 to 14.5 years), boys will sometimes double this amount. These findings are consistent with earlier studies at the University of Washington by Baum.[1] Experience will yield a subjective impression for estimation of these conditions.

The findings for the present cases are grossly as shown in Table IV.

Therefore, the technique for anticipating the change in the chin (Fig. 9) consists of (1) taking into consideration the form, shape, and size of the mandible, (2) evaluating the type of face to which it is associated (that is, facial pattern), (3) planning the results of possible treatment procedures that

might be exercised, (4) changing the direction of the Y axis on the basis of the above considerations, and (5) growing the chin by lengthening the Y axis, depending on age, sex, physical constitution, and duration of treatment. Following the drawing of the chin, a new facial plane is erected.

TABLE IV. GROWTH ON THE Y AXIS (SGn INCREASE) IN 250 CASES

AGE	BOYS (110)		GIRLS (140)	
	NUMBER IN GROUP	MEAN PER YEAR	NUMBER IN GROUP	MEAN PER YEAR
Up to 6	6	3.3	19	3.0
7	4	4.1	12	3.7
8	15	2.9	19	2.6
9	13	3.2	17	3.4
10	16	2.8	20	3.3
11	17	3.0	15	3.1
12	15	3.9	19	2.6
13	16	3.9	12	2.7
14	6	3.1	3	.7
15	2	1.0	4	.7

Average mean of all ages: 2.6 for girls; 3.1 for boys.

Step 3. Changes in the maxilla: During normal development, the angle SNA changes but little (Table I). The findings of Brodie[5] and Lande[14] seem to corroborate this contention. Björk found that the angle SNA sometimes decreased in long retrognathic growth patterns. Personal communication with Björk did not reveal the frequency of this behavior, but he seems to feel that it was significant. Studies of patients with normal occlusion suggest that SNA increases slightly.

The normal behavior of point A has been discussed previously as almost paralleling forward growth of nasion. During orthodontic treatment, point A has been demonstrated to change rather dramatically. Holdaway,[11] King,[12] and I,[20] as well as many others, have demonstrated retraction of point A in the profile in vigorous Class II treatment (Table I). I have further observed point A to move forward in response to treatment of Class III and cleft palate cases and have discussed this in a recent publication.[21] Watson[28] and Klein[13] both noted a downward tipping of the palatal plane in cases treated with cervical traction which suggests an alteration of the entire maxilla.

Furthermore, the present serial studies on treated cases suggest the possibility of a slight alteration of the entire nose. King has presented data to suggest that earlier treatment results in greater change in the profile. Thus, the timing of orthodontic treatment is related to its effect, particularly in contour alteration.

The technique for estimating the behavior of point A and the palatal reference is as follows:

A. For height estimate (Fig. 10), first divide the increase in facial height roughly into thirds. Next, lower the palatal plane from the SN line about one-third of the total height increase. (Due to bite opening, approximately two-thirds of height increase is usually recorded in the denture area.) Finally, tip the palatal plane by "high-pull" or

"neck-pull" extraoral anchorage or vigorous intermaxillary elastics, depending upon the case, the degree of force employed, and the duration of that force.

B. For alteration of point A (depth), modify point A from a local and also for complete maxilla changes as *desired* or *expected* following the listed factors. Simple lingual root torque with retraction of the upper incisor can result in a change in contour of the subspinale area amounting to 2 or 3 mm. of change from the anterior nasal spine.

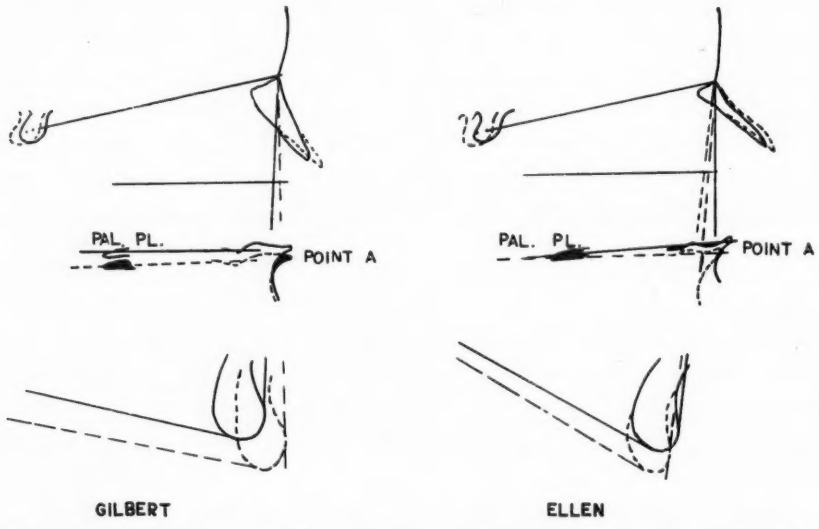


Fig. 10.—Estimation of Skeletal profile changes (point A and new APog plane). Register is on facial plane and palatal plane is dropped one-third total facial height increase. Palate is tipped depending upon growth pattern and anticipated treatment. It is necessary to move point A registered from SNA as desired or thought possible (see Table II). Headgear was envisioned in both cases; therefore, point A was expected to be moved backward in both. Severe bodily retraction of the upper incisor increased projected backward movement of point A in Ellen's case.* New APog plane is thus established. (See Fig. 10 for follow-through.)

*This is the crux of the use of the APog plane in planning. The plane itself will be changed by (1) forward growth of the chin or (2) reduction of point A and retraction of the maxilla. Only after the proper estimation of these skeletal changes can the proper correction of the teeth be made.

(See Ann's tracings in Fig. 2.) Cervical traction only has been noted to be consistent with up to 5 mm. posterior change in point A in some retrognathic cases. *Heavy* intermaxillary elastics also contribute to reduction of point A. Thus, when *torque* is used and *extraoral anchorage* is employed together with heavy intermaxillary elastics (1 x Orthospec), up to 7 or 8 mm. reduction of point A in the profile can be demonstrated in cooperative cases.

Thus, the changes in point A or the maxilla, together with the change in pogonion or the chin, now yield a new skeletal profile in the estimation (Fig. 10).

Step 4. The setup of the teeth cephalometrically (Fig. 11): As stated previously, the APog plane or denture plane serves as a useful reciprocal reference line for evaluating the lower incisor. Now that a new reference line

has been established in the "cephalometric setup," the procedure for aligning the incisor is much the same as for the static synthesis described previously. However, certain growth considerations should be observed.

A working occlusal plane is set up by bisecting the palatal and mandibular planes. I have demonstrated changes in the occlusal plane.[19] *Facial type* and the duration and force of intermaxillary elastics determine its change.

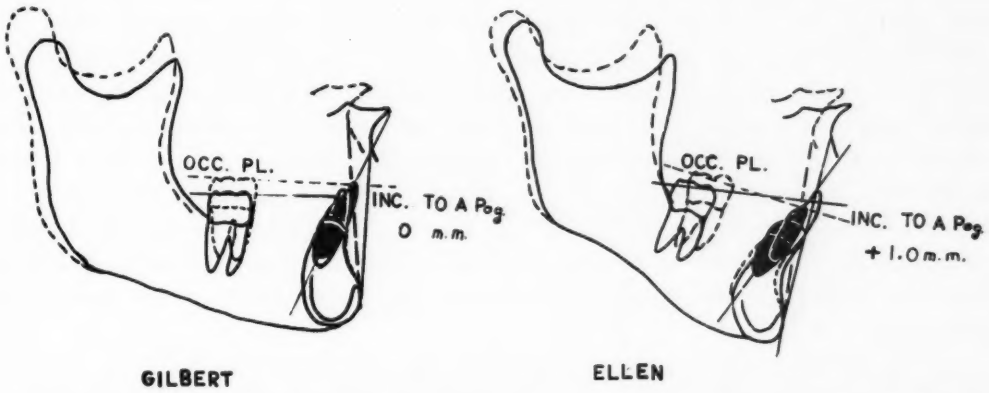


Fig. 11.—Lower incisor to the new APog plane. The lower incisor is corrected to one standard deviation of the mean consistent with local environmental factors. In Gilbert's case forward movement of the lower incisor was indicated; therefore, no extraction was planned. In Ellen's case backward movement with depression of the incisor was indicated, so extraction of lower first premolars was planned. Both cases were set up almost on the APog line. Note the estimation of occlusal plane changes and molar movement as these changes in the incisors are anticipated.

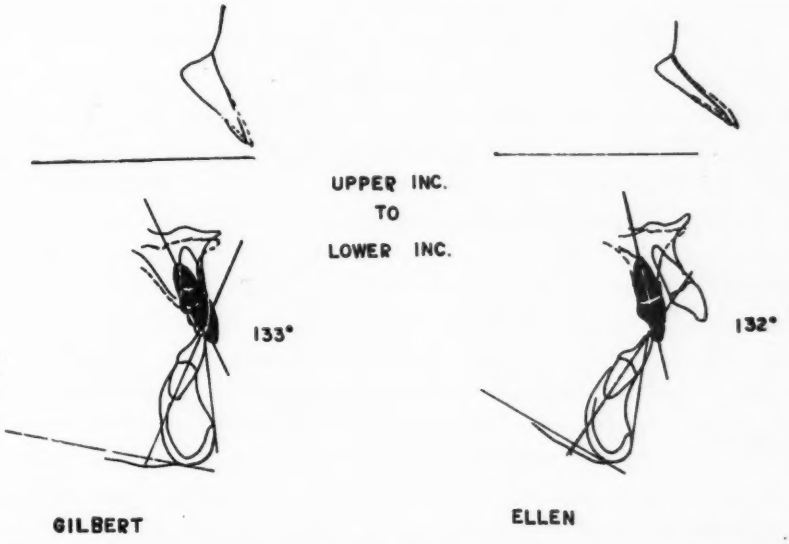


Fig. 12.—Upper incisor corrected to the lower incisor. The interincisal angle is set up to 130 to 135 in children to allow for later uprighting with growth. In Gilbert's tracings the final analysis yields a forward movement of the upper incisor due to anticipated mandibular growth. (See Fig. 13 and Table III.) In Ellen's case bodily distal movement is indicated. The angle SN-upper incisor will reveal the behavior of the upper incisor to cranial landmarks (Table III).

The lower incisor is first properly located, and then the upper incisor is established in relation to it in a normal overbite and overjet. Age is important.

In mixed-dentition cases an attempt is made to incline the upper incisor at about 130 degrees to the lower to provide for later uprighting with growth (Fig. 12).

In cases in which originally the lower incisor is posterior to the APog plane more than 2 mm. or outside the normal range, the synthetic setup will show whether the *lower incisor must be moved forward intentionally* with the accompanying risks or whether *mandibular growth and retraction of point A* will account for an improved relationship (Fig. 11). Thus, in some cases the lower incisor must be moved forward to satisfy the normal objectives (Figs. 1 and 11). In patients with very small mouths, tight lips, and a low and small tongue, the natural balance is posterior to the normal and should thus be stated in the objectives and in the cephalometric setup. On the other hand, a prominent lower incisor 2 to 3 mm. forward of APog will often be in good balance when accompanied by long lips that are well forward, a wide mouth, and a large tongue that is located forward. Mouth characteristics and tongue size and function are thus important to denture stability and should be respected.[21]

After the incisors have been aligned, the change in the lower molar can be also estimated (Fig. 11). If no arch length problem prevails and no anchorage problem is anticipated, the lower molar will simply erupt in compliance with the pattern usually observed (Table II). It is thus carried downward and forward by normal growth. In ordinary extraction requiring space closure, the lower molar moves forward about 4 mm. unless held backward by lower headgear or intermaxillary elastics.

The needed change in the upper molar can thus be seen by simply arranging the upper molar in Class I occlusion or as desired (Fig. 13). It is very difficult to move the upper molar backward more than 2 to 3 mm. In some cases much vertical increase will permit the upper molar to be moved downward and backward. In many Class II cases simply holding the upper molar in its original position will produce correction if normal growth is great enough.

This technique permits a rather critical treatment plan, and unusual extraction patterns are not uncommon. Extraction of upper first or second premolars or lower first or second premolars, unilateral premolar extraction, or a variety of molar extractions have thus been worked out when needed. An evaluation of extraction cases has revealed that extraction of upper second and lower first premolars has yielded a superb occlusion, ideal esthetics, and quite stable results. Knowledge of the "synthesis procedure" has made many of these extraction patterns evident.

Thus, if desired, the entire denture (including the third molars) can be traced into the estimation. I usually try to estimate at least the incisors, cuspids, and first molars.

Step 5. Changes in the soft tissues of the profile: The changes in four aspects are estimated (Fig. 13).

First, the end of the nose is advanced away from the anterior nasal spine in the "setup" about 1 mm. per year in the mixed dentition in both sexes

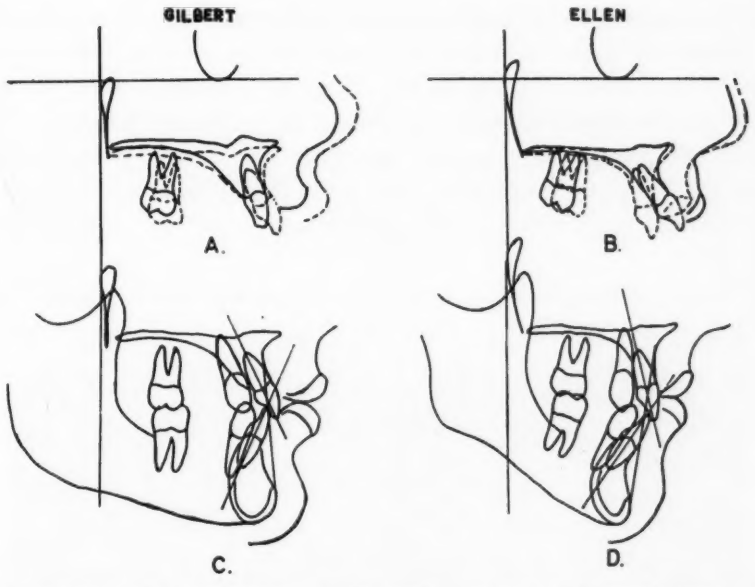


Fig. 13.—Growth and movement of the upper molars and possibilities of correction of soft tissues. *A* and *B*, Tracings superpositioned on Frankfort plane at posterior curvature of pterygomaxillary fissure. Normal behavior is downward and forward 2 mm. per year. (See Table III.) Note downward movement in Gilbert and horizontal movement in Ellen. Second-premolar extraction in Ellen was thus planned. Growth of the nose is estimated from anterior nasal spine. (See Table III.) *C* and *D*, Total denture setup and soft-tissue outline of the chin and lips. Upper lip thickens and lower lip follows the incisors. Chin drops as mentalis is reduced. (See text.)

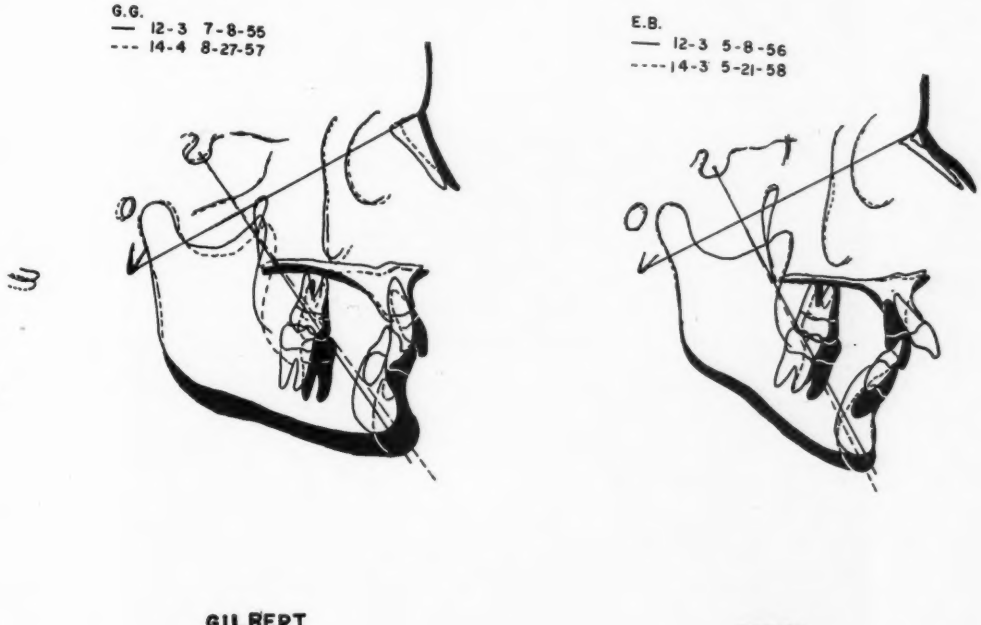


Fig. 14.—Over-all changes in cases superimposed on BaN at Y axis. Note forward growth of mandible and closing of Y axis in Gilbert. Y axis length increase was almost 12 mm. in two-year period. End result is forward movement of upper incisors. Note slight opening of the Y axis and slightly greater SN growth than expected in Ellen. Note also the large amount of lingual movement of the upper incisor. Y axis increased only 6 mm. in this girl at puberty. Note the bend of the nasal bone as a curve developed. (See Fig. 17, *C*.)

and in girls at puberty. In large-nosed boys at puberty, it is advanced 2 mm. per year (Table III).

Second, the contour of the upper lip will not change when no growth occurs or when the upper incisor remains in the original position. The upper lip will thicken slightly with normal growth, but it will often thicken appreciably when the upper incisor has been retracted. A good "rule of thumb" is 1 mm. thickening for every 3 mm. retraction of the tip of the incisor (Figs. 3, 13, and 17).

Third, the lower lip thickens very little, but it will curl backward as a result of upper incisor retraction and come forward with forward movement, as in

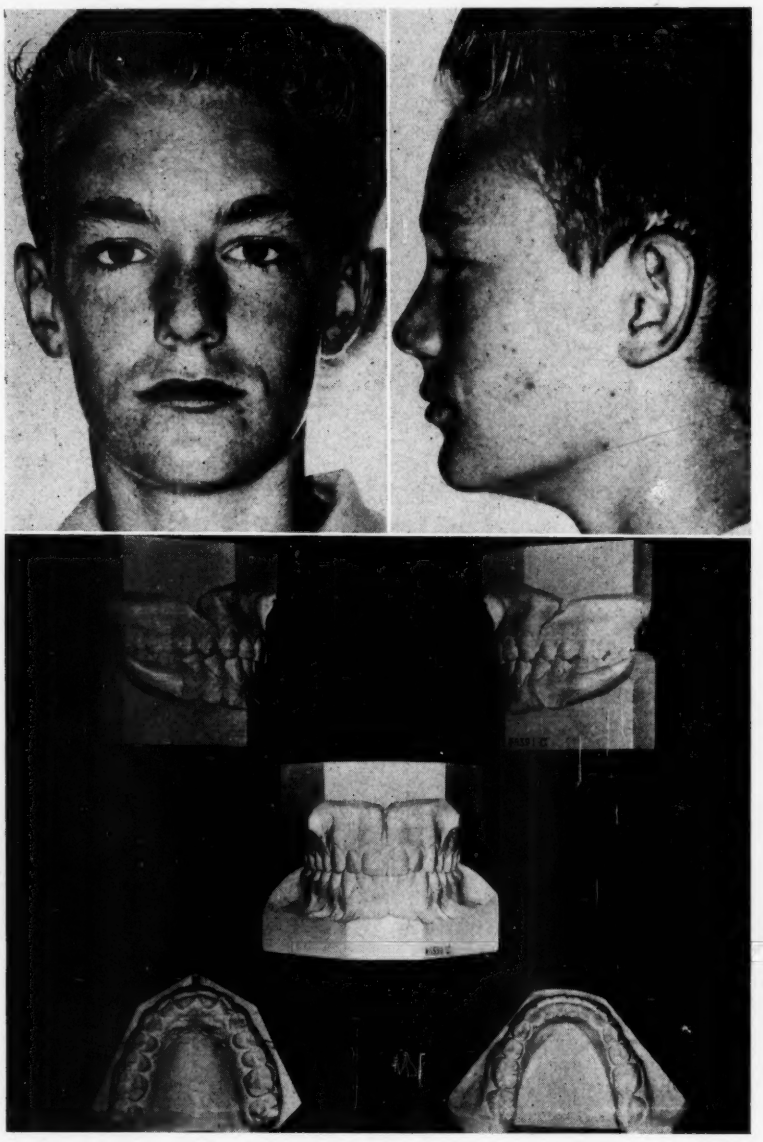


Fig. 15.—After-treatment records on Gilbert. Note the decrease in canine furrowing and excellent lip relationship for 14-year-old boy. Retention of two years was uneventful. Compare to beginning records in Fig. 8 and also see Fig 17.

Class II correction. (See Robert's case, Fig. 3.) The greatest noticeable alteration, however, is in the sublabial area. Here the lip tissue follows rather closely the change in position of the root of the lower incisor.

Fourth, an increase in the tissue over the chin will occur as a result of loss of lip strain and loss of chin elevation by the mentalis muscle. In some long faces, due to shortness of the lips, this change will not occur in spite of denture retraction. In most cases the ball of soft tissue will lower to proper position after treatment (Fig. 17).

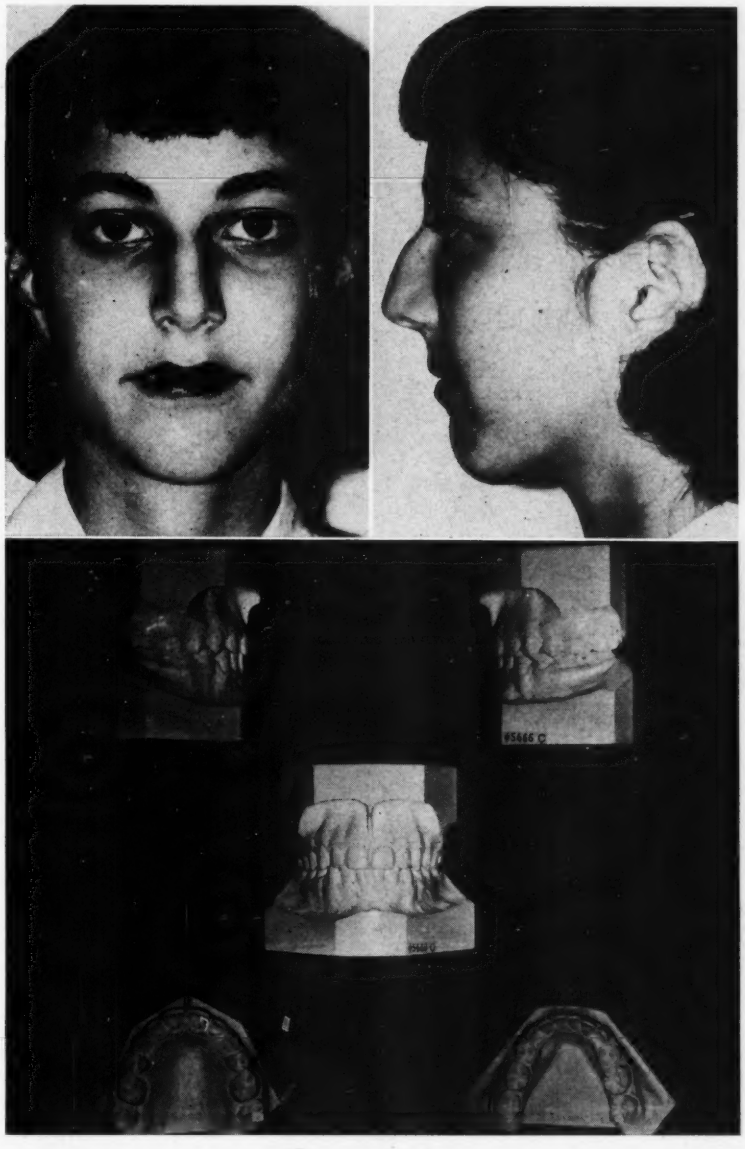


Fig. 16.—After-treatment records on Ellen. Note the loss of lip strain and mentalis habit present in the beginning (Fig. 9). Teeth are upright and all spaces are closed in retention models. No appreciable changes in the denture were noted during retention. Note comparison to original in Fig. 17.

After these changes have been estimated, a superimposing of the esthetic planes of the original and the "setup" will demonstrate the probable esthetic results of growth and treatment. Figs. 14, 15, and 16 show the completed cases planned by the synthesis procedure.

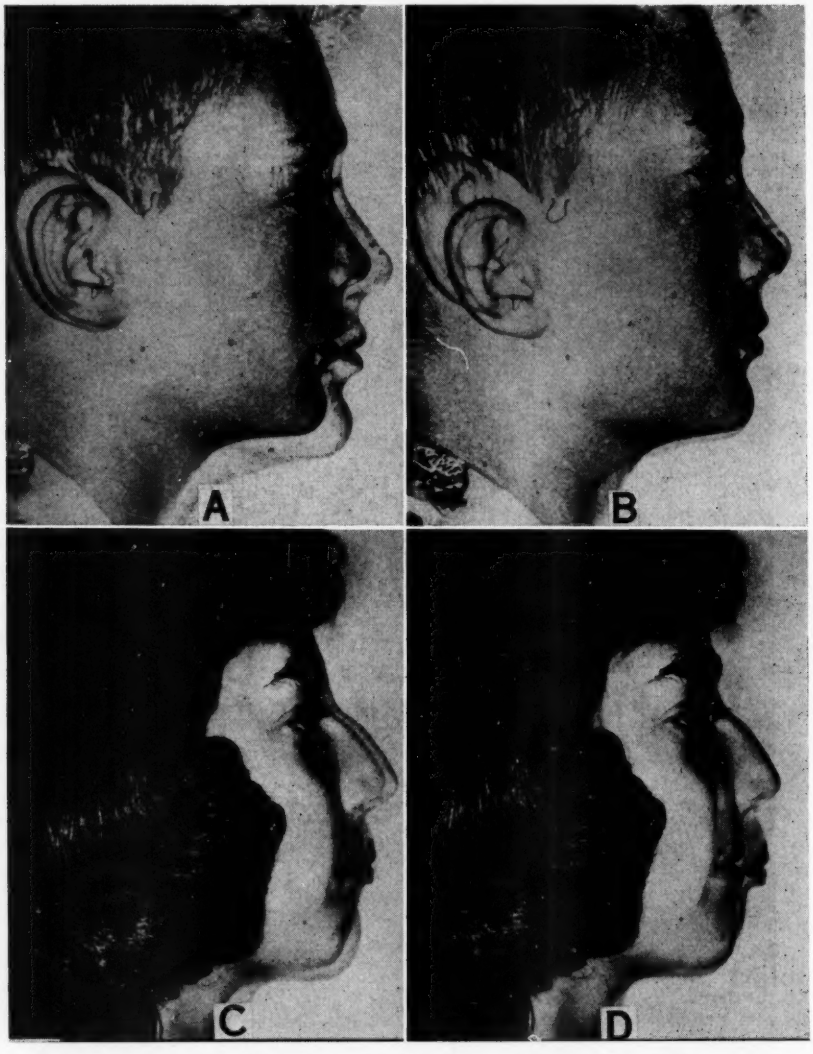


Fig. 17.—Comparison of oriented photographs of Gilbert and Ellen. *A*, Photographs of Gilbert superimposed on sella. *B*, Photographs of Gilbert superimposed on "E" plane. Forward movement of the denture and lips was cancelled out by nose and chin growth. *C*, Photographs of Ellen superimposed on sella. There was more reduction of mouth area than can be accounted for by growth. *D*, Photographs of Ellen superimposed on "E" plane show dramatic resulting improvement in the profile.

GENERAL DISCUSSION

There is a growing effort to attempt to estimate changes in the face and denture to occur during orthodontic treatment. This has become necessary as clinicians have realized that analysis is one thing and that growth and tooth changes constitute indeed another subject. It is realized that this procedure is

one of the initial efforts in this facet of cephalometrics. It is hoped, however, that it is not misrepresented. It is not a "crystal ball." In my opinion, it is strictly *information that is available utilized with common sense.*

A simple method of planning was suggested in order to provide the mechanism for anticipating the most important changes. A second tracing is thought necessary when a large amount of growth is anticipated, because of the need for superimposing at many different reference points in working out a plan and anticipating change. These tracings thus form a "blueprint" for the operator in the orthodontic-orthopedic aspects of the case. The synthetic setup can be as complete or as partial as desired.

Cephalometrics employed in this manner has been indispensable to my practice. Anything short of full consideration is now considered to be neglect of the patient.

In some cases growth may be slower than anticipated. *Usually growth will come eventually when it is anticipated to be of benefit and is relied upon properly.* Simple patience with observation will be indicated when growth is slow. In many cases failures blamed on a lack of growth are the results of mistakes in diagnosis made in the beginning because of a misunderstanding of the manner in which growth helps in treatment.

As more and more information becomes available through research, it will be added to this armamentarium. No doubt new devices and procedures will continue to be developed, and each must be studied carefully.

No orthodontist should fear this cephalometric procedure. The results of viewing, tracing, and planning are gratifying and exciting. In order to interpret much of the contemporary literature, the orthodontist must keep himself informed on recent techniques.

This procedure has actually saved time in the office. It saves treatment time by aiding in more efficient technique planning and by proper utilization of natural forces. It permits complete presentation of the case to the parent and helps promote greater confidence and better cooperation on the part of the child. Finally, there can be no doubt that superior results can be achieved when greater attention is given to the kind of details brought out in this discussion.

SUMMARY

Any treatment plan is a prediction of change. This article stresses the need for more understanding of the application of cephalometrics in treatment planning. A cephalometric procedure was thus shown to help establish the *objectives* for a particular case.

Such terms as prediction, projection, prognosis, estimation, predetermination, and cephalometric setup have come to be related to anticipation of the future behavior of an orthodontic case. The term "cephalometric synthesis" has been employed to mean a putting-together of many related growth and anchorage factors to yield the product or the planned result in a new tracing.

"Synthesis" was divided into "static" and "dynamic" types with regard to growth of the jaws. When static conditions exist, or when little or no growth

is expected, a formula for tooth arrangement was suggested for the individual case depending upon local environmental factors. The APog plane or the "denture plane" was held to be of greatest usefulness for this purpose because it represents a reciprocal relationship of the denture bases to which the anterior teeth must be related functionally. Thus, a mutual role is played by the lower incisor to both the maxilla and the mandible.

An abstract of a serial study of 250 cases was reported to shed light on growth and treatment behavior. A sequence of steps was presented as a simple approach to estimating growth and desired treatment changes in the "dynamic synthesis." These, simply, were a cranial base reference (sella-nasion), change in the mandibular profile as viewed from the Y axis, change in the maxillary profile, movement of teeth, and change in the soft-tissue profile.

Two boys and two girls with different facial patterns, malocclusions, and growth rates were selected to illustrate the procedure. Differences in the significance of age, sex, facial pattern, and malocclusion were thus demonstrated.

This technique is a step beyond cephalometric analysis. It is an attempt to put research into action. Its proper use depends upon a background of information on growth and the possibilities of change with mechanical therapy. Much of this information has been provided in two of my articles, one published in 1955[19] and the more recent and exhaustive work published in 1960.[23] When this information is properly utilized, a host of different treatment plans that employ natural changes and forces to advantage become obvious. A knowledge of the possibilities of treatment is *carte blanche* for a positive attitude toward planning rather than the negative attitude imposed by the doctrine of limitations.

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NASOMAXILLARY PROPORTIONAL CONSTANCY

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INTRODUCTION

IN 1951 I published data[1] supporting my contention that reference points representing the incisal edge of the maxillary permanent central incisor and the occlusal surface of the maxillary permanent first molar lie nearly equidistant from nasion. Standardized lateral cephalic roentgenograms of a sizeable clinical (maloccluded) sample constituted the material. These findings were supported by Prakash and Margolis[2] in a subsequent paper.

This linear association is now conceived as a rigid proportional property of the nasomaxillary complex. It is my purpose in this article to substantiate and elucidate the nature of this proportionality in terms of facial anatomy and occlusion in a study of normal occlusal material. Change with age, relationship to the overbite, basic problems of dentofacial orientation, and diagnostic potentiality are explored.

MATERIAL

The material consists of tracings of the standardized lateral roentgenograms of forty-two Caucasian Seattle school children selected as having normal occlusions.[3] Table I lists the age level and sex distribution of the sample. There

TABLE I

	GROUP I FOUR-YEAR INTERVAL		GROUP II SIX-YEAR INTERVAL	
	IA	IB	IIA	IIB
Age (years)	8	12	12	18
Boys	13	13	8	8
Girls	13	13	8	8
Pooled sample: N = 42				

are two age group categories, with an equal number of boys and girls in each category. The twenty-six children of Group I were traced at the 8-year level (IA) and at the 12-year level (IB). The sixteen children of Group II were traced at the 12-year level (IIA) and at the 18-year level (IIB). This allowed for a longitudinal study of changes with age from 8 to 12 and from 12 to 18. It also permitted a sizeable cross-sectional pooled sample of forty-two occlusal normals at the 12-year level.

Presented before the Northern Component of the Pacific Coast Society of Orthodontists, Portland, Oregon, Dec. 7, 1959.

METHODS

The roentgenograms were traced according to recommended procedures. Since the permanent first molars and permanent central incisors were of particular interest, the contours of these teeth were double checked against standardized lateral roentgenograms in the open jaw position.

The following reference points, planes, and angles were used (Figs. 1, *A* and 2, *B*):

Reference Points

1. *Nasion (N):* The most anterior point of the nasofrontal suture.
2. *Maxillary permanent central incisor reference point (U1):* The most inferior point on the incisal edge of that tooth.
3. *Maxillary permanent first molar reference point (U6):* The point on the shadow of the occlusal outline of that tooth halfway between mesial and distal shadow contours.
4. *Mandibular permanent central incisor reference point (L1):* The most superior point on the incisal edge of the lower permanent central incisor.
5. *Pogonion (Po):* The most anterior point of the bony chin.
6. *Sella turcica (S):* The center of sella as determined by inspection.

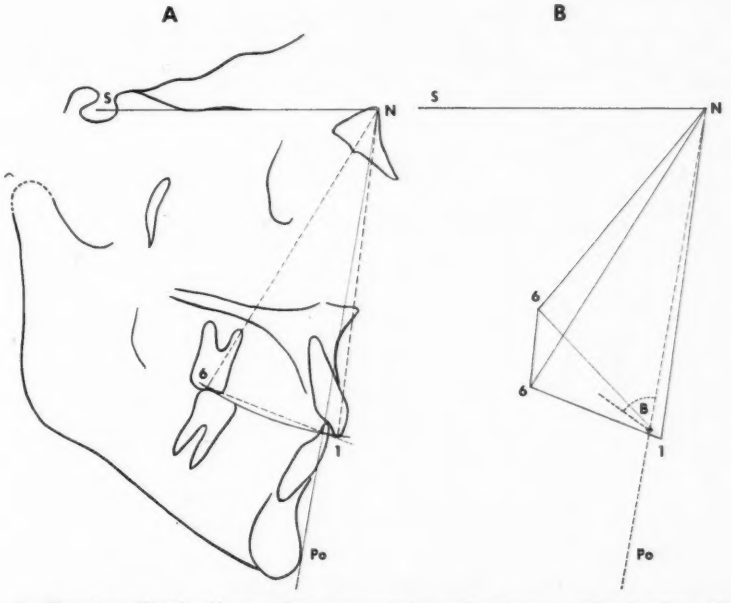

Fig. 1.—*A*, Tracing illustrating reference points and planes. The broken lines represent the components of the nasomaxillary proportionality, N-U1, N-U6, and the U1-U6 plane.
B, Three-dimensional tetrahedron representation of the dimensional limits of the nasomaxillary proportionality. Note angle B, the maxillary dentofacial plane angle.

Planes

1. *Anterior cranial base plane:* The N-S plane.
2. *Maxillary dental plane:* The U1-U6 plane.
3. *Facial plane:* The N-Po plane.

Angles

1. *Craniofacial plane angle:* The SNPo angle (Fig. 2, *B*, angle A).

2. *Maxillary dentofacial plane angle:* The angle formed at the proximal superior juncture of the facial plane with the U1-U6 plane (Figs. 1, *B*, and 2, *B*, angle B).

3. *Maxillary dentocranial base plane angle:* The angle formed at the juncture of the projections of the U1-U6 plane and the N-S plane (Fig. 2, *B*).

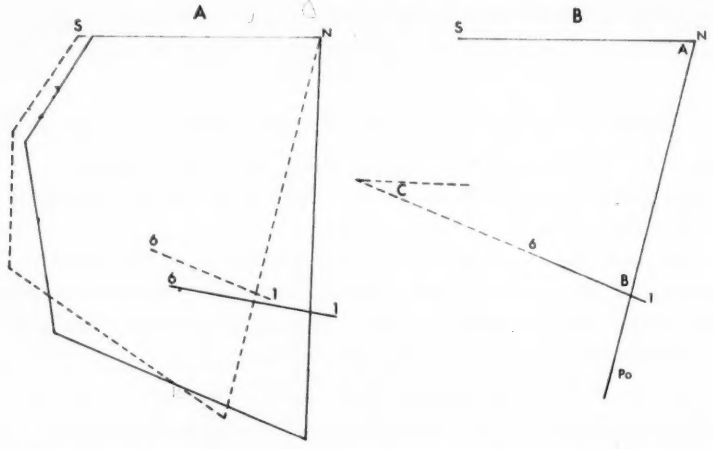

Fig. 2.—*A*, The superimposed facial diagrams of the two 12-year-level cases showing the greatest extreme of craniofacial plane angles.

B, The planes and angles used in the study. These are the cranial base plane, S-N; the facial plane, N-Po; and the maxillary dental plane U1-U6. Angle A is the craniofacial plane angle, angle B is the maxillary dentofacial plane angle, and angle C is the maxillary dentocranial base plane angle.

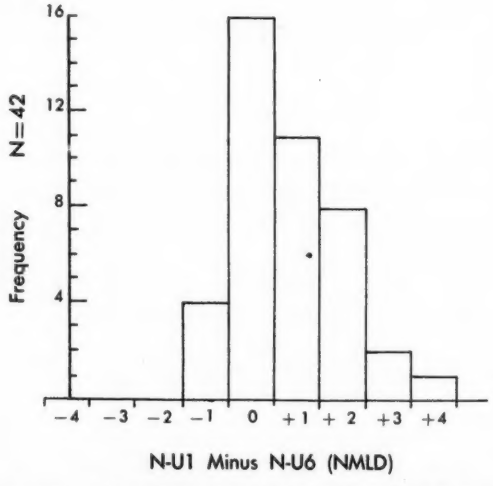

Fig. 3.—Histogram illustrating the frequency distribution of the nasomaxillary linear difference in the 12-year-level sample of forty-two cases.

Linear Measurements

1. *Nasomaxillary linear difference (NMLD):* For ease in describing the properties of the proportionality, I have found it convenient to work with the difference of the component lengths N-U1 minus N-U6. By subtracting the nasion-to-molar length from the nasion-to-incisor length, one determines how much nearer or farther the incisor point lies in relation to nasion as compared to the molar point. This comparison can be made easily on the tracing by inscribing an arc of radius N-U6 (Fig. 1, *A*). The distance that the incisor reference point lies from the nasion-molar arc is the difference between N-U1 and N-U6

(NMLD). If U1 lies closer to nasion than U6, it will fall above the arc and the difference in the component lengths of the proportionality (NMLD) will be negative. If the incisor reference point falls farther away from nasion than does the molar reference point, N-U1 minus N-U6 will be positive by the distance that point U1 lies below the nasion-molar arc. If both dental reference points lie equidistant from nasion, the incisor reference point will fall on the nasion-molar arc, and NMLD will be zero (Fig. 3).

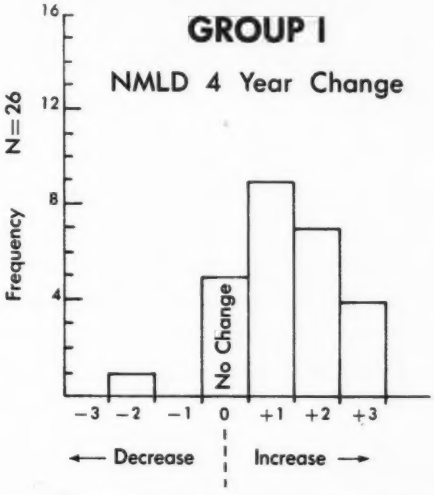

Fig. 4.—Histogram illustrating the frequency distribution of NMLD values as they changed from the 8-year level to the 12-year level.

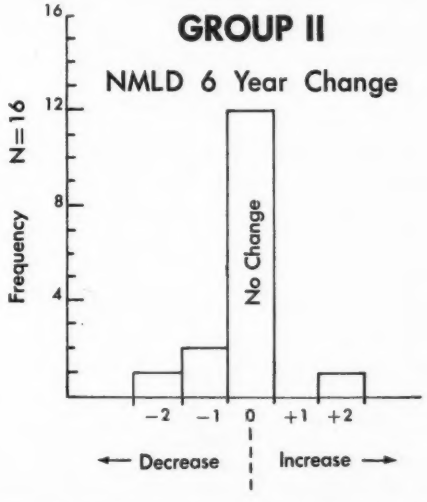

Fig. 5.—Histogram illustrating the frequency distribution of the changes in NMLD value between the 12-year level and the 18-year level.

2. *Proportionality change with age:* The change with age of the nasomaxillary linear difference, the measure of proportionality, was determined in each child by subtracting the younger NMLD value from the older NMLD value (Table I and Figs. 4 and 5). A positive difference indicates an increase in NMLD. In such cases, the incisor point lies relatively farther from nasion as compared with the nasion-molar distance than it did formerly. A negative difference means a decrease in the value of NMLD with age and suggests that the nasion-molar distance has increased to a greater extent than the nasion-incisor distance.

3. *Overbite (OB):* The overbite was determined by projecting the maxillary and mandibular incisor reference points (U1 and L1) perpendicularly upon the facial plane and then measuring the distance between these projected points on the facial plane.

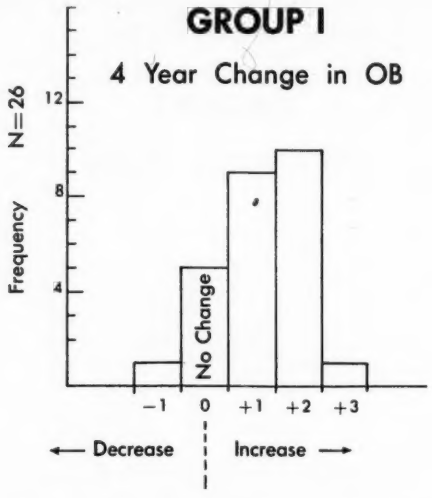

Fig. 6.—Histogram illustrating the frequency distribution of the changes in overbite values from the 8-year level to the 12-year level.

4. *Overbite change with age:* The overbite change with age was determined by subtracting the younger overbite value from the older overbite value. A positive difference means an increase in the overbite with age, while a negative difference suggests a decrease in the overbite with age (Figs. 6 and 7).

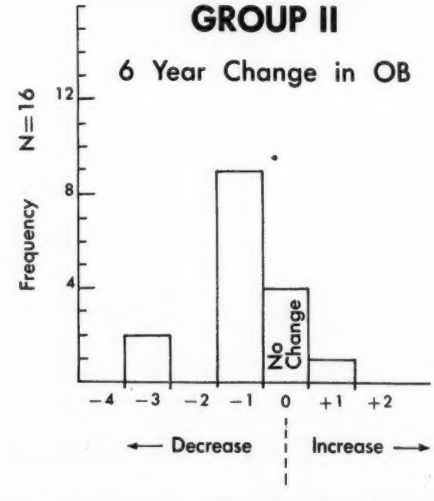

Fig. 7.—Histogram illustrating the frequency distribution of the change in overbite from the 12-year level to the 18-year level.

All angles were recorded to the nearest degree and all linear measurements to the nearest millimeter. The data were subjected to thorough statistical scrutiny, and the results are listed in Tables II and III.

TABLE II

VARIABLE	SAMPLE	N	M	S.D.	S.E.
1. NMLD	IB + IIA	42	0.83	±1.124	±0.1735
2. NMLD	IA to IB	26	1.115	±1.07	±0.21
3. NMLD	IIA to IIB	16	–0.12	±0.81	±0.20
4. OB	IB + IIA	42	3.095	±1.117	±0.1805
5. OB	IA to IB	26	1.192	±0.939	±0.184
6. OB	IIA to IIB	16	–0.88	±1.02	±0.26
7. Angle A	IB + IIA	42	79.714°	±3.64°	±0.5623°
8. Angle B	IB + IIA	42	80.286°	±1.89°	±0.29°
9. Angle C	IB + IIA	42	19.619°	±3.84°	±0.593°

FINDINGS

Nasomaxillary Proportionality.—The value of the nasomaxillary linear difference in the pooled 12-year level sample is of interest (Table II, *1*). The mean was found to be 0.83 ± 0.1735 mm., with a standard deviation of ±1.124 mm. In a statistical sense, this means that the NMLD value in this sample ranges from –0.294 to +1.954 mm. in 68.3 per cent of the group. In actual fact, over 83 per cent of the group fell between 0 and 2 mm. The distribution of this value at the 12-year level is graphically revealed in the histogram shown in Fig. 3.

It was determined that the nasomaxillary linear difference changes with age. In Group I the four-year change from the 8-year level to the 12-year level showed an average increase of N-U1 over N-U6 of 1.115 ± 0.21 mm., with a standard deviation of ±1.07 mm. (Table II, *2* and Fig. 4). The reverse trend was seen to occur in Group II, where the six-year change from the 12-year level to the 18-year level indicated a slight average *decrease* in the nasomaxillary linear difference, with a mean change of –0.12 ± 0.20 mm. and a standard deviation of ±0.81 mm. (Table II, *3* and Fig. 5).

Proportionality and the Overbite.—The relationship between the nasomaxillary linear difference and the overbite was investigated. The overbite was determined for each of the forty-two children in the pooled sample at the 12-year

TABLE III

CODE	SAMPLE	CORRELATIONS				
		N	r	r^2	S.E.E.	P
A	IB + IIA	42	+0.3782	0.1430	1.234	$0.01 < P < 0.05$
B	I	26	+0.455	0.2066	0.7285	$0.01 < P < 0.05$
C	II	16	+0.827	0.6842	0.3553	$P < 0.01$
D	IB + IIA	42	–0.04	0.0017	1.29	$P < 0.25$
E	IB + IIA	42	+0.38	0.144	1.11	$0.01 < P < 0.05$
F	IB + IIA	42	–0.63	0.398	0.78	$P < 0.01$

Key:
A = NMLD versus overbite.
B = NMLD change with age versus overbite change with age.
C = NMLD change with age versus overbite change with age.
D = NMLD versus craniofacial plane angle (Fig. 2, *B*, angle A).
E = NMLD versus maxillary dentocranial plane angle (Fig 2, *B*, angle C).
F = Craniofacial plane angle versus maxillary dentocranial plane angle (Fig. 1, *B*, angle B).
N = Number of cases.
r = Coefficient of correlation.
r^2 = Coefficient of determination.
S.E.E. = Standard error of estimate.
P = Probability.

level (Table II, *4*). Variance in overbite was correlated with variance in the difference of N-U1 minus N-U6. The specific problem here was to determine whether fluctuations in the overbite were correlated with fluctuations in the positions of points U1 and U6 relative to nasion. There was no significant correlation (Table III, *A*).

The coefficient of correlation (r) for the pooled sample was +0.3782. The coefficient of determination (r^2) at 0.1430 can be interpreted as meaning that about 14 per cent of the total overbite variance can be explained by NMLD variance. In other words, vicissitudes of overbite among normal occlusions must be primarily due to factors other than the NMLD values.

Age Change in the Proportionality and the Overbite.—The proportionality as expressed by the value of the nasomaxillary linear difference was found to change slightly with age, as already stated. Overbite is also subject to age change. It increases an average of 1.192 ± 0.184 mm., with a standard deviation of ±0.939 mm., in the interval from the 8-year level to the 12-year level (Table II, *5* and Fig. 6). It decreases in the 12- to 18-year interval by an average of –0.88 ± 0.26 mm., with a standard deviation of ±0.26 mm. (Table II, *6* and Fig. 7).

Since the NMLD seemed to change in the same direction with age as did overbite, a correlation was run between NMLD age change and overbite age change. In the Group I sample, the coefficient of correlation (r) between these two variables was +0.455, with a coefficient of determination (r^2) of 0.2066 (Table III, *B*). This can be interpreted as meaning that about 20 per cent of the increase in overbite from the ages of 8 to 12 years can be "explained" by increase in NMLD. At the 12- to 18-year level the correlation was appreciably higher (r = +0.827), with a coefficient of determination of 0.6842, meaning that 68 per cent of the decrease in overbite in the older group can be "explained" by decrease in NMLD.

Craniofacial Orientation.—When cephalometric tracings of different persons are superimposed upon cranial base planes, we usually find a varying degree of noncorrespondence of the facial parts (Fig. 2, *A*). In the case of comparisons involving persons with normal facial structures and occlusions, I choose to apply the term *normal craniofacial positional variance* in describing this noncorrespondence.

The evidence indicates that the *intrafacial* component reference points N, U1, and U6 of the nasomaxillary proportionality described above are related in fairly rigid fashion. Two questions are examined concerning the craniofacial orientation of the nasomaxillary complex:

1. Is the nasomaxillary complex as delineated by the proportionality components consistently related to the mandible?
2. Is the proportionality influenced by craniofacial positional variance?

The components N-U1 and N-U6 may be pictured as forming the arms of the near isosceles triangle N-U1-U6. If this construction is conceived in three

dimensions, the result is a tetrahedron (a polyhedron of four faces), the base of which is formed by the maxillary dental plane (Fig. 1, *B*). The maxillary dental plane U1-U6 should not be confused with the occlusal plane. The spatial orientation of this plane is determined by the positions of points U1 and U6. These, in turn, are nearly equidistant from nasion in a very large percentage of occlusal normals. This plane is therefore a valid expression of the orientation of the components of the proportionality. Some of the angular relationships of the plane are used to test the problems of orientation posed above.

The statistical properties of the maxillary dentofacial plane angle (angle B in Fig. 1, *B* and 2, *B*) are of interest. This angle relates the mandible to the nasomaxillary complex. It has a mean value of 80.28 degrees ± 0.29, with a standard deviation of ±1.89 degrees (Table II, *8*). The significance of the small variance of the angle will be discussed at length in the following sections.

In contrast to the relative constancy of the maxillary dentofacial plane angle, the two other angles analyzed showed no unusual variance (angles A and C in Fig. 2, *B* and Table II, *7* and *9*).

There appeared to be no correlation between the craniofacial angle (Fig. 2, *B*, angle A) and the NMLD values (Table III, *D*). Variance of NMLD was not significantly correlated with variance of the angle formed by the maxillary dental plane and the anterior cranial base plane (Table III, *E* and Fig. 2, *B*, angle C).

DISCUSSION

Nasomaxillary Proportionality.—N-U1 and N-U6 traverse and are confined to components of the nasomaxillary complex. This is the complex of facial bones consisting of the nasal bones and the maxilla with its associated teeth and alveolar bone. The constancy with which N-U1 and N-U6 approximate each other as measured by the small mean and small variance of their difference (Fig. 3) is most remarkable, considering the variety of structures through which these lines pass in the nasomaxillary complex. Each intercepts different segments of the nasal bone, maxilla, alveolar process, and tooth structure. *There seems to be a rigid proportionality inherent in the nasomaxillary complex. This characteristic constitutes a sort of common denominator of upper dentofacial orientation.*

These findings point to the existence of a mechanism encompassing and yet extending appreciably beyond the dentition, which aids in guiding the teeth to those positions which we recognize as constituting normal occlusion. The existence of such a mechanism was clearly implied in the writings of Angle and others who, noting the regularity with which teeth assume this biologically ancient tooth-to-tooth relationship, logically hypothesized an underlying skeletal harmony to account for this relatively inflexible dental orientation.

The rigidity of the proportionality holds promise of elucidating the nature of vertical bite problems. Since the value of clinical standards is directly proportional to their *lack of variance,* the nasomaxillary linear difference and the maxillary dentofacial plane angle have this attribute in their favor. Investigation exploring clinical applications is currently underway.

The Proportionality and the Overbite.—There was no significant correlation between fluctuations in the overbite and fluctuations in the positions of U1 and U6 relative to nasion (Table III, *A*). This is interpreted as meaning that variations in the degree of overbite among occlusal normals must be attributed primarily to mandibular structure. This finding is consistent with other investigations.[4]

Change With Age.—The slight increase in the nasomaxillary linear difference from the 8-year to the 12-year levels, with a concomitant increase in overbite, can probably be attributed to the eruption of the incisors, which had only partially attained their full eruption in the younger groups (Figs. 4 and 6).

The slight decrease in NMLD from the 12-year to the 18-year levels is associated with a decrease in the overbite. This is believed to be associated with facial maturation and is consistent with Brodie's[5] findings (Figs. 5 and 7).

Craniofacial Orientation.—In the construction of the maxillary dentofacial plane (angle B, Fig. 1), the two contributing planes are (1) the facial plane, N-Po, and (2) the maxillary dental plane, U1-U6. Points U1 and U6 are rigidly oriented to nasion, as previously described. The only reference point contributing to angle B which is *not* a part of the nasomaxillary complex is pogonion. The small variance of angle B (mean = 80.29 degrees; standard deviation = 1.89 degrees) is in contrast to the usual cephalometric angular standard deviations of 3.5 degrees or larger.

Angle B is an expression of the spatial orientation of pogonion to the nasomaxillary complex. The small variance of this angle seems to indicate a fairly rigid pattern of orientation between nasomaxillary complex and mandibular point, pogonion, in these occlusal normals. This finding is almost a foregone geometric sequel to the near equality of N-U1 and N-U6 and the relatively close position of point U1 to the facial plane in these normal cases.

Fig. 2, *A* reproduces the tracings of the two 12-year level children with the most extreme values of angle SNPo (angle A). The solid line represents the craniofacial diagram of a boy with a cranial base-facial plane angle of 88 degrees. The dotted line represents the craniofacial diagram of a girl with a cranial base-facial plane angle of 75 degrees. In the boy's case, points U1 and U6 are situated nearly equidistant from nasion; in the girl's case, the incisor point is 1 mm. closer to nasion than the molar point. The maxillary dentofacial plane angle was 80 degrees in both cases.

Upon examining these tracings, it seems, in a purely figurative sense, as though the entire facial complex as a unit, pivoting upon nasion, swings from under the cranial base to assume a more "retrognathic" position in the one case as against a more "prognathic" position in the other.

The terms "prognathic" and "retrognathic" do not really apply here. This degree of craniofacial positional noncorrespondence is attributed to normal *craniofacial positional variance.* The nearly identical nasomaxillary proportionality and maxillary dentofacial plane values in these two occlusally normal persons indicates a basic intrafacial similarity that is in sharp contrast to their obvious craniofacial positional disparity as manifested in Fig. 2.

Any study testing for common dimensional grounds between these two diagrammed persons and using only cranial base reference points is doomed to confusion by virtue of the error introduced by craniofacial positional variance. The error introduced by normal craniofacial positional variance is responsible, in my opinion, for much of the considerable range of variance—linear, proportional, and angular—that is so often attributed to positional properties of the teeth within the face and to variance in facial component relationships themselves.

Reference to Tables II and III brings into sharp focus the stability of the intrafacial angle B in contrast to the variable characteristics of the cranial-base to facial-structure angles A and C (Fig. 1). Variance in angles A and C is not correlated with variance in NMLD. This indicates that the proportionality is independent of craniofacial positional variance. Finally, the strong negative correlation between Angles A and C is to be expected in view of the constancy of the third angle, B, of the triangle ABC.

SUMMARY AND CONCLUSIONS

1. A longitudinal and cross-sectional study of the lateral cephalometric tracings of forty-two subjects with normal occlusions was undertaken to elucidate the nature of a previously established maxillary dentoskeletal pattern.

2. It was statistically determined that reference points representing the incisal edge of the maxillary central incisor and the occlusal surface of the maxillary permanent first molar are situated nearly equidistant from nasion in these occlusal normals. The statistical results confirm that this pattern prevails within extremely small limits of variance.

3. A study of the diverse dentoskeletal structures contributing to the pattern has led to the conclusion that this stable relationship is a proportional property of the nasomaxillary complex.

4. This rigid proportionality, encompassing the dentition and yet extending appreciably beyond the teeth, is believed to be instrumental in regulating the occlusion. The small variance of the proportionality suggests its role as a sort of common denominator of upper dentofacial orientation.

5. The small changes in the proportionality with age are attributed to continued dental eruption in the 8- to 12-year interval and to skeletal maturation in the 12- to 18-year interval.

6. These longitudinal changes in the proportionality are positively correlated with changes in the overbite. However, vicissitudes in the overbite are not significantly correlated with variance in the proportionality. This suggests that variance in the overbite is largely determined by factors associated with the mandible.

7. A study of the craniofacial orientation of the components of the proportionality led to an examination of normal craniofacial positional variance as an obscuring factor in cephalometric analysis. Normal individual differences in craniofacial positioning can obscure basic intrafacial similarities. Nasomaxillary proportional constancy is not influenced by craniofacial positional

variance. The constancy of the orientation of pogonion to components of the proportionality was also largely attributed to freedom of these measurements from the obscuring influence of craniofacial positional variance.

8. The small variance in the proportionality and its relationship to the vertical orientation of the occlusion suggests its usefulness in assessing vertical occlusal problems.

I am grateful to Dr. Alton W. Moore, Head of the Department of Orthodontics, University of Washington, School of Dentistry, for his generous loan of the material. I am indebted to Carl E. Hopkins, Ph.D., Associate Professor of Public Health and Preventive Medicine, University of Oregon, and his assistant, Virginia B. Berry, for the statistical analysis. I wish to express my appreciation to Dr. Don H. Carlson, Head of the Department of Orthodontics, University of Oregon, School of Dentistry, and Dr. Bhim S. Savara, Director of the Child Study Clinic, University of Oregon, School of Dentistry, for their constructive reading of the original manuscript.

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502 Portland Medical Center.

THE ALBERT H. KETCHAM MEMORIAL AWARDS

FOR the benefit of those who might not know about this Award, let me briefly review its history. In 1929 the American Association of Orthodontists, under the leadership of Dr. Ketcham, who at that time was president of the Association, adopted a proposal creating the first national certifying board for an American dental specialty. This organization was incorporated in 1930 as the American Board of Orthodontics. In 1936, after the death of Dr. Ketcham, the Albert H. Ketcham Memorial was established by the American Board of Orthodontics in collaboration with the American Association of Orthodontists. It quite naturally followed that the Ketcham Award, the material symbol of this Memorial, should be presented to the recipients by the Board.

L. Bodine Higley.

PRESENTATION OF THE ALBERT H. KETCHAM MEMORIAL AWARD FOR 1960 TO E. SHELDON FRIEL BY L. BODINE HIGLEY, PRESIDENT OF THE AMERICAN BOARD OF ORTHODONTICS

DR. FRIEL, your associates consider you the senior orthodontic specialist in Europe. Of outstanding significance is the fact that your own university created for you a special professorship. You were a pioneer researcher in dentistry and, together with other early investigators, suffered the questionable tolerance with which your fellow dentists viewed your early investigative attempts. Nevertheless, you persevered and were able to enrich the professional literature with reports of your studies.

It is known that you have trained many pupils on a personal preceptorship basis in addition to your services at the University of Dublin. Although your main interest has been orthodontics, it is noted that you have acquired a wide knowledge of antique furniture and have a magnificent collection of tea caddies. More recently you have become keenly interested in gardening.

Dr. Friel, you are the first recipient from abroad to be selected for the Ketcham Award, and it is with sincere appreciation of your contributions to our profession and with great personal pride that I present you with this Award.

E. SHELDON FRIEL

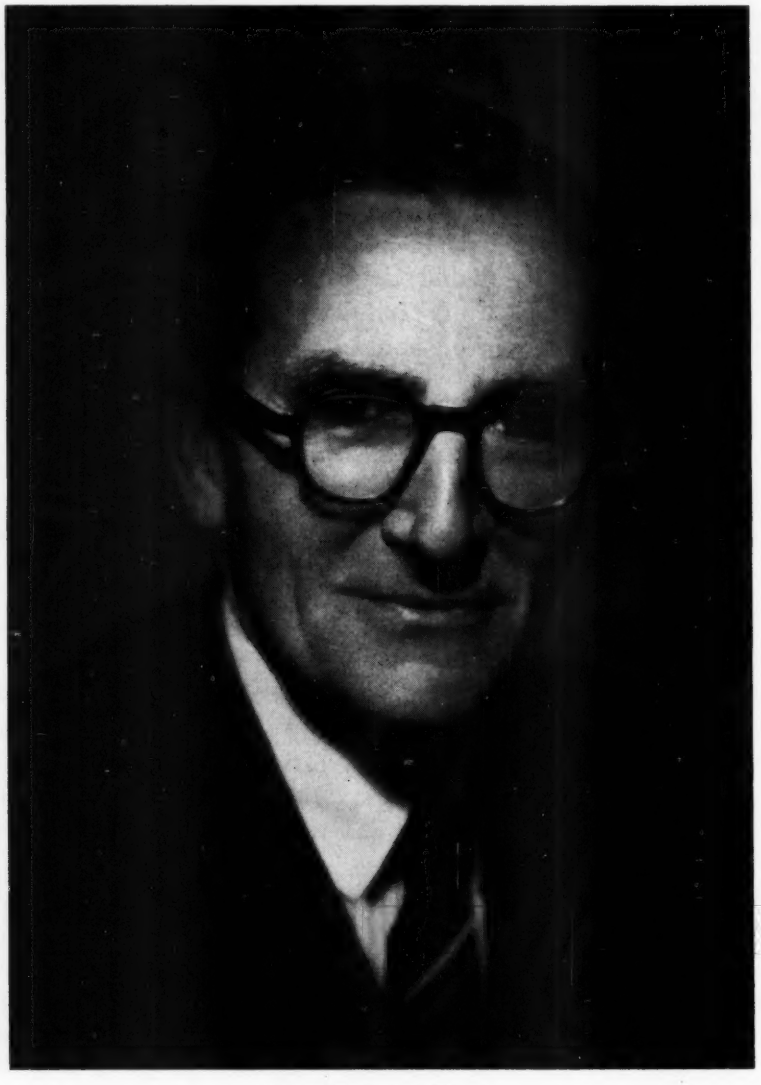
Biographical Data

Born: **Feb. 26, 1887, at Waterford, Ireland.**

Education:

Trinity College, University of Dublin (B.A. 1908, M.Dent.Sc. 1909, Sc.D. 1928).
Diplomate Angle Postgraduate School of Orthodontia, New London, Connecticut, 1909.

F.D.S. (Fellow of Dental Surgery), Royal College of Surgeons, England, 1948.
F.D.S. (Fellow of Dental Surgery), Royal College of Surgeons, Edinburgh, 1951.
D.D.O. h.c. (Diplomate in Dental Orthopedics, *honoris causa*) Royal Faculty of Physicians and Surgeons, Glasgow, 1954.



DR. E. SHELDON FRIEL.

Professional Societies:

President, Irish Dental Association, 1932.
President, British Society for Study of Orthodontics, 1924.
President, European Orthodontic Society, 1935.
President, Odontological Section, Royal Society of Medicine, London, 1949.

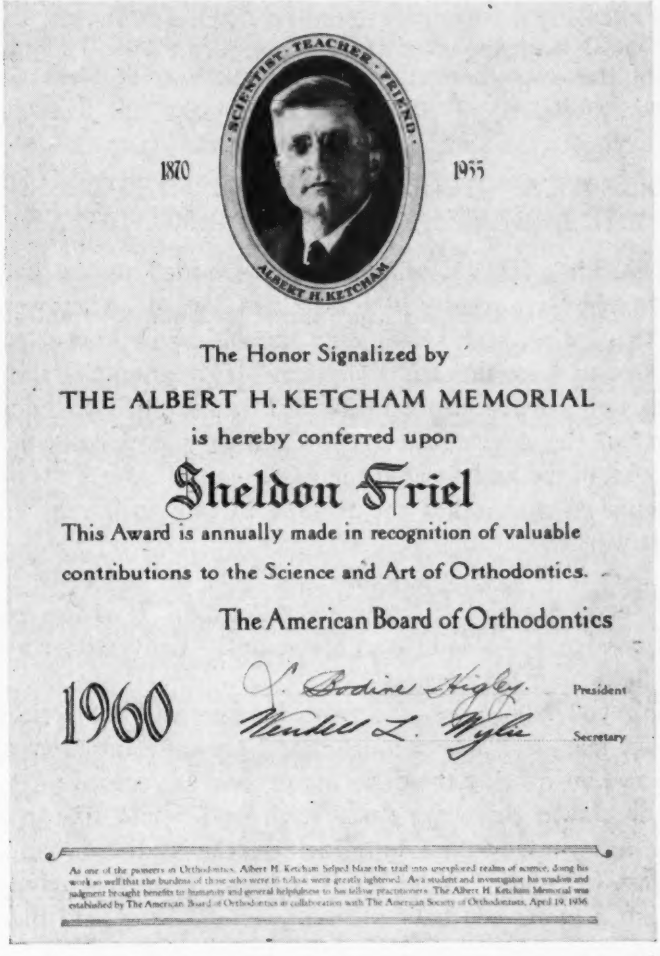
Honors:

Hon. President, Fédération Dentaire Internationale, 1957.
Villain Prize in Orthodontics, Fédération Dentaire Internationale, Rome, 1957.
Hon. Member, Irish Dental Association, 1957.

Hon. Member, European Orthodontic Society, 1958.
Hon. Member, British Society for the Study of Orthodontics, 1959.

Professional Activities:

Lecturer in Orthodontics, Trinity College, University of Dublin, 1910.
Professor of Orthodontics, Trinity College, University of Dublin, 1941.
Director of the School of Dental Science, Trinity College, University of Dublin, 1956.
Orthodontist, Incorporated Dental Hospital of Ireland.
Exclusive practice of orthodontics since February, 1910.



ALBERT H. KETCHAM MEMORIAL AWARD CONFERRED UPON DR. E. SHELDON FRIEL.

Contributions to Literature:

The Effect of the War Diet on the Teeth and Jaws of the Children of Vienna, Austria, *Tr. American Society of Orthodontists,* 1921, and INT. J. ORTHODONTIA, 1921.

Muscle Testing and Muscle Training (Presidential Address), *Tr. British Society for the Study of Orthodontics,* 1924; *Dental Record,* 1924.

Occlusion; Observations on Its Development From Infancy to Old Age, *Tr. First International Orthodontic Congress,* 1926.

The Relation of Function to the Size and Form of the Jaws, *Proc. Odontological Section, Royal Society of Medicine,* 1928-29.

The Practical Application of Stainless Steel in the Construction of Fixed Orthodontic Appliances, *Tr. British Society for the Study of Orthodontics,* 1933.

Orthodontic Education: Undergraduate and Postgraduate (Presidential Address), *Dental Record,* 1936; *Tr. European Orthodontic Society.*

(with McKeag, H. T. A.): The Design and Construction of Fixed Orthodontic Appliances in Stainless Steel, *Dental Record,* 1939; *Tr. European Orthodontic Society.*

Migration of Teeth, *Dental Record,* 1949; *Tr. European Orthodontic Society,* 1948.

Orthodontic Diagnosis, *Proc. Odontological Section, Royal Society of Medicine,* 1949, Presidential Address.

Development of Ideal Occlusion of the Gum Pads and the Teeth, *Tr. British Society for the Study of Orthodontics* (Northcroft Lecture, 1951) 1953.

Determination of the Angle of Rotation of the Upper First Permanent Molar to the Median Raphe of the Palate in Different Types of Malocclusion, *Tr. British Society for the Study of Orthodontics,* 1958.

RESPONSE BY E. SHELDON FRIEL TO THE PRESENTATION OF THE ALBERT H. KETCHAM MEMORIAL AWARD

IT IS an astonishing thing to find my name added to the list of illustrious orthodontists who have received the Ketcham Award. They were the founders of modern orthodontics, and I feel very humble to be placed among them. I had the privilege of knowing Dr. Ketcham. He was on the staff of the Angle School in 1909, and I met him again in 1911 and in 1913 at the meetings of the Alumni Society of the Angle School. I was a very junior member, but on each occasion he spoke to me and treated me as an equal. One does not forget when such a distinguished man takes the trouble to talk to a very small person in the orthodontic world.

I realize that it is a very special distinction for me to be the first person from outside North America to receive the Award. It is the greatest honor I could possibly receive, but also it is an honor to the University where I have tried to teach orthodontics for fifty years.

I do thank you, sir, most sincerely, for the very flattering remarks you have made about me. Is it any wonder that I am suffering from a swelled head? However, I know how quickly the deflating process can set in!

Before I sit down, there are three subjects I would like to speak on, very briefly. They are controversial but, luckily, the audience cannot discuss my remarks, at least in public. You, Mr. President, have the privilege of answering me back, but I know you have a kind heart. I have held these opinions for a long time, and experience has led me to hold them more firmly.

The first subject that I want to raise is the relationship between general dentistry and orthodontics. I, personally, think that there is very little relationship between the two. General dentistry deals with diseases of the teeth and gums and with pathologic conditions of the surrounding tissues. Orthodontics, on the other hand, deals with the general growth of the child (bone, muscles, and functional posture), the growth of the bones of the face, the relationship of the jaws to one another, and the influence of genetics and environment on this growth and relationship. The face as a whole and the arrangement of the teeth are what we are interested in, and these depend on development of bone

modified to some extent by the external influences of muscles, function, and habits. On the whole, dentistry and orthodontics are entirely different subjects.

The second point that I want to touch on is the graduate, or what in Europe we call the postgraduate, training of orthodontists. When a student qualifies in dentistry and makes up his mind that orthodontics is to be his life-work, the sooner he sells his dental instruments the better. He should start his education in orthodontics at once. I have had postgraduate students who have taken their training immediately after receiving their dental degree and others who have waited until some years after qualification. I have found the former easier to teach, as the latter are under the disadvantage of having learned to think as dentists and not as orthodontists, which is a completely different thing. They have to unlearn this outlook, and some are never able to do so. To train as a specialist, a man may have to spend two years in a university, learning thoroughly the basic sciences and clinical orthodontics. He will have to read all that he can find relating to orthodontics and, a most important point, he will have to learn how to carry out research projects and, indeed, start to work on some form of research. Apart from the value of the results of research this has the great advantage of extending to many related subjects and it is one of the most important parts of postgraduate training. The training of orthodontists in this country is very thorough. First, a higher degree has to be obtained; then comes certification by the American Board of Orthodontics, and for this a thesis on an original investigation is one of the requirements.

The opportunities for thorough orthodontic training in the universities in the British Isles are, unfortunately, very limited. There are two diplomas in orthodontics, but neither is of a very high standard. The two higher qualifications are Fellow of Dental Surgery, Royal College of Surgeons of England, and Fellow of Dental Surgery, Royal College of Surgeons of Edinburgh, and these are conferred only after examination in general dentistry. Thus, in Great Britain at present it is essential for anyone hoping to rise to a professorship in orthodontics to be a Fellow of Dental Surgery in general dentistry, and this is a waste of valuable time. A medical student qualifies, and he is at liberty to practice medicine, surgery, and obstetrics. He can also specialize in medicine and get an M.D. degree or membership in the Royal College of Physicians, he can specialize in surgery and get an M.Ch. degree or fellowship in the Royal College of Surgeons or, finally, he can specialize in obstetrics and gynecology and get an M.A.O. degree or a fellowship in the Royal College of Obstetrics and Gynecology. Now all these higher degrees have an equal standing. Why should there not be a fellowship in orthodontics, a separate specialty of dentistry, of the same standing as a fellowship in dental surgery of the Royal College of Surgeons?

My great hope is that there will arise another Ketcham with the ability, the high ideals, and the drive to gather around him kindred spirits who will demand a higher qualification in orthodontics which will be of the same standard as the fellowship in dental surgery.

I thank you most sincerely for having honored me with the Ketcham Award.

PRESENTATION OF THE ALBERT H. KETCHAM MEMORIAL AWARD FOR 1960 TO CHARLES H. TWEED BY L. BODINE HIGLEY, PRESIDENT OF THE AMERICAN BOARD OF ORTHODONTICS

DR. TWEED, the records show that you were born in 1895 in Phoenix, Arizona, and that you received your education in the public schools of that city, your preliminary college training at Leland Stanford University, and your dental training at the University of California College of Dentistry, from which you graduated with a D.D.S. degree in 1919.

You were in the general practice of dentistry for some seven years. In 1927 you took the Angle course conducted by George Hahn in Berkeley, California, and then spent six weeks with Dr. Angle in Pasadena. Through my long acquaintance with you and with those who know you best, I have accumulated considerable knowledge of your aspirations for orthodontics and of your trials and experiences in attempting to put them into effect. For example, while you were with him, Dr. Angle convinced you that the status of orthodontics needed to be improved, both in the dental schools and in the eyes of the dental profession, and that the public should be protected from orthodontic treatment rendered by dentists not prepared to give this service.

It appears that from that time on your goal has been to raise the standard of clinical orthodontics. To do this, influenced as you were by Dr. Angle, your first act was to convince the dentists of Arizona that orthodontic legislation was desirable for the public's protection. As a result of your extensive travel for this purpose and the expenditure by you of borrowed funds amounting to several thousand dollars, the Arizona State Legislature enacted a bill which established the first law governing the practice of any of the specialties. You became the first man in your state to specialize in any of the branches of dentistry.

It soon became evident that the American Dental Association did not approve of the Arizona law, and the American Association of Orthodontists suggested the formulation of the American Board of Orthodontics as a better means of elevating and controlling the practice of orthodontics. Pressures from outside your state necessitated your attempt to defend the law against the opposition and criticisms of the Arizona dentists, the result being that six years after its inception the law was repealed. The bitterness of the Phoenix dentists because of your legislative efforts forced you to leave the place of your birth and move your practice to Tucson.

Failing to obtain legislative help, you next attempted to raised the standards of clinical orthodontics through a teaching program. In preparation for this, you decided that it was necessary to perfect your own clinical effectiveness by solving the requirements of excellent facial esthetics and more stable results of therapy. Analysis of previous treatment results led to your re-treating, without fee, some 300 children to reduce the bimaxillary occlusions previously produced. Through this study you perfected to your satisfaction

a technique of space closure following extraction of four first premolars as well as a better relationship of teeth to the basal bone of the jaws and improved facial esthetics.

Your findings, treatment methods, and results commanded attention, and soon the number of orthodontists visiting your office to investigate your methods became too great for you to accommodate. Those who had visited

DR. CHARLES H. TWEED.

you formed, at first, a study club which met in Tucson for one week each year, and as this group grew it eventually formed the Tweed Foundation for Orthodontic Research. A teaching program was a natural outgrowth of the Foundation's activities, and I find that since 1945 more than 600 men have taken your course.

Your teachings have shaken the complacency of some of us, but whether or not you have contributed to the elevation of the standards of orthodontics will have to be left to individual judgment. The Committee that selected you for this Award believes that you have, and that is the main reason why, on their behalf and on behalf of the American Association of Orthodontists, it gives me much pleasure to present this Award to you.

CHARLES HENRY TWEED

Biographical Data

Born: June 24, 1895, in Phoenix, Arizona.

Parents: Charles Henry Tweed (a businessman) and M. Adelaide Hutchinson Tweed.

Education: Phoenix public schools; Phoenix Union High School; Leland Stanford University, Palo Alto, California, 1915-1916 (Premed.); University of California College of Dentistry, 1916-1919 (D.D.S.); The Angle School of Orthodontia in California, 1927-1928.

Married: Elizabeth O. Raley on Aug. 16, 1916.

Children: Ruth Patricia, Alice Elizabeth, and Mary Susan.

Dental Career: Practiced general dentistry from 1919 to 1927 in Ray, Arizona, a small mining town. In 1927 he gave up the practice of general dentistry and took the Angle course conducted by George Hahn in Berkeley, California. From there he went to Pasadena to spend six weeks with Dr. Angle. During that time, Dr. Tweed was influenced by Dr. Angle to attempt the passage of orthodontic legislation in Arizona. He returned to Phoenix to practice orthodontics. The law was passed in 1929. Dr. Tweed practiced in Phoenix for seven years and then moved to Tucson in 1933.

Church: Baptized a Roman Catholic.

Organizations: American Board of Orthodontics; American College of Dentists; Psi Omega; Omicron Kappa Upsilon; American Dental Association; American Association of Orthodontists, Southern California Component; Charles H. Tweed Foundation for Orthodontic Research; Arizona State Dental Association; Edward H. Angle Society of Orthodontia.

Honors:

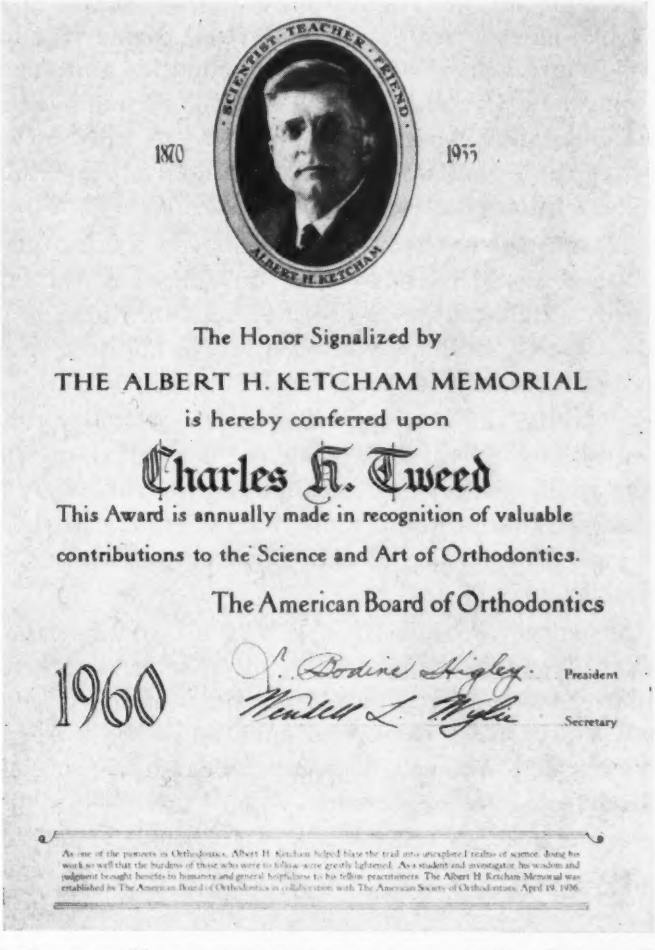
1. Miembro Honorario, Colegio de Odontologos of Venezuela, 1947.
2. Miembro Honorario, Sociedad Colombiana de Orthodoncia, 1949.
3. Professor, Honoris Causa, de la Escuela de Odontologia de La Universidad de Habana, 1949.
4. Miembro Honorario, Assoc. Mexicana de Ortodoncia, 1955.

Publications:

1. The Application of the Principles of the Edgewise Arch in the Treatment of Malocclusions, *The Angle Orthodontist,* January, 1941.
2. Soldering Technic for Steel Arch Wire, *The Angle Orthodontist,* January, 1941.
3. Indications for the Extraction of Teeth in Orthodontic Procedure, AM. J. ORTHODONTICS & ORAL SURG., August, 1944.
4. A Philosophy of Orthodontic Treatment, AM. J. ORTHODONTICS & ORAL SURG., February, 1945.
5. The Frankfort-Mandibular Plane Angle in Orthodontic Diagnosis, Classification, Treatment Planning, and Prognosis, AM. J. ORTHODONTICS & ORAL SURG., April, 1946.
6. Why I Extract Teeth in the Treatment of Certain Types of Malocclusion, *The Alpha Omegan,* Autumn, 1952.
7. Evolutionary Trends in Orthodontics, Past, Present, and Future, AM. J. ORTHODONTICS, February, 1953.
8. The Frankfort-Mandibular Incisor Angle (FMIA) in Orthodontic Diagnosis, Treatment Planning and Prognosis, *The Angle Orthodontist,* July, 1954.

RESPONSE BY CHARLES H. TWEED TO THE PRESENTATION OF THE ALBERT H. KETCHAM MEMORIAL AWARD

The vision of Horace H. Hayden and Chapin Harris of a profession of dentistry separate and distinct from that of medicine has resulted in dental progress that had its beginning link forged 120 years ago. Since then many links have been added, and today the chain is of great length.



ALBERT H. KETCHAM MEMORIAL AWARD CONFERRED UPON DR. CHARLES H. TWEED.

I am moved and greatly flattered to think that the members of the American Board of Orthodontics and my respected professional colleagues believe that, through my endeavors to elevate the standards of clinical orthodontics, I may have added a single link to the long chain of dental progress.

No one ever received the highest honor that can be bestowed upon him by his profession without realizing that the groundwork was laid for him by others perhaps more deserving than he. I am no exception.

Of the various persons, both friends and otherwise, who have done much to crystallize my professional activities, a few friends stand out slightly above the many who have influenced and enriched my life. I owe a debt of gratitude to

the late Guy S. Milberry, my dean at the University of California, for the fatherly interest, the encouragement, and the many kindnesses that he bestowed upon me as a student; to George H. Hahn, perhaps above all others, who conducted the Angle course in Berkeley, California, when ill health forced Dr. Angle to be absent from Pasadena, for the many valuable hours he spent teaching Angle's fundamentals of cleanliness, neatness, mechanical precision, and one's responsibility to his profession; to the late Edward H. Angle for his harsh kindnesses and for the inspiration and constructive psychological influence that he has had on my life; and to Cecil Steiner for his friendly encouragement in arousing my interest in orthodontics and for leading me to Dr. Angle's front door. Dynamic and ageless, Bob Strang has been and always will be one of the greatest inspirations of my life, as will be Herbert Margolis who introduced me to cephalometrics and who, by his beautiful philosophy of life, is such an inspiration to all who know him intimately.

Few men experience the ultimate in friendship. I am the exception, for I possess two such lifelong friends—Glen Terwilliger of Oakland, California, and Roscoe Keedy of Pasadena, California, both of whom are most capable clinical orthodontists. I am doubly blessed for, in addition to these two men, I have many others whose friendship I cherish.

It is with humility and a great sense of responsibility that I accept the Ketcham Award into my keeping, to be shared with all those who came before me and with the membership of the Foundation that bears my name, particularly with the members of the teaching staff who have worked so diligently with me these past fifteen years in the endeavor to elevate the standards of clinical orthodontics.

If I had the power to bequeath a gift to all young orthodontists, their professional lives would be as romantic, interesting, and soul-satisfying to them as mine has been to me. For the blessings of the freedom and opportunities granted by the most wonderful country in the world; for my many friends, both young and old; and for the privilege of serving children, I give thanks to my God.

Orthodontic Profiles

FREDERICK SUMNER McKAY

ON AUG. 21, 1959, the world-famous Frederick Sumner McKay died at the age of 85, but his life and his work in dental research, specialization, teaching, and active practice will be an inspiration to our profession for many years to come. In addition to an unsurpassed career in the nationwide and worldwide promotion of dental health through water-fluoridation programs stemming from his pioneer studies on dental fluorosis and the relationship between dental decay and the fluoride content of water supplies, he consummated nearly three score years of general dental practice, specialization, and teaching.

Dr. McKay was born in Lawrence, Massachusetts, on April 13, 1874, the son of Edward and Harriet Wells McKay. He attended the public schools of Milford and Boston, Massachusetts, and in 1897 matriculated at Boston Dental College (now Tufts University). He entered the junior class of the University of Pennsylvania Dental School in 1898 and graduated on June 9, 1900. As an undergraduate student, he was president of the Edward C. Kirk Dental Society, grand master of Epsilon Chapter, Delta Sigma Delta fraternity, and musical director of the Pennsylvania University Band.

Dr. McKay was licensed to practice dentistry in Massachusetts, Colorado, Missouri, and New York. From 1900 to 1905 he practiced general dentistry in Colorado Springs, except for an interval of study at the Angle School of Orthodontia in St. Louis in 1903. In 1905 he returned to St. Louis, where he practiced orthodontics and taught at the Angle School of Orthodontia. He returned to Colorado Springs for health reasons in 1908 and practiced orthodontics there until 1917.

In 1912 he became interested in periodontics as a result of studies under Cassius M. Carr. Finding it difficult to get children into his office in the mornings, he started devoting his mornings to periodontics and his afternoons to orthodontics. Recognizing the importance of adequate treatment of periodontal disease, and being eager to practice with a prominent dentist in the application of periodontics, Dr. McKay became associated with the late D. W. Tracy in New York City in 1917. From 1925 to 1930 he also served in the Clinic on Periodontia at Presbyterian Hospital in New York. After Dr. Tracy's death in 1937, Dr. McKay's interests again reverted to Colorado and he returned to Colorado Springs in 1940. There he continued the practice of periodontics almost until the day of his death.

The many offices, teaching posts, and honorary memberships held by Dr. McKay include several in orthodontics. He was secretary of the American Society of Orthodontists in 1906; sueprintendent of instruction at the Angle School of Orthodontia in St. Louis from 1905 to 1908; professor of orthodontia at Denver Dental College in 1910 and 1911; and in 1955 he was made an honorary member of the Rocky Mountain Society of Orthodontists. In 1956 the American Association of Orthodontists also conferred an honorary membership on Dr. McKay, as one of its own who had furthered dental health immeasurably through his concurrent activities in the field of fluoridation.

Truly the "Father of Fluoridation,"* Dr. McKay unceasingly pursued his lifework in this renowned aspect of his broad professionalism. As he wrote in his memoirs: "It was the first day of January, 1901, when in the early morning the horse-drawn stage left the small hamlet, Evergreen, in the Colorado Rockies, bound for Morrison, about a dozen miles down Bear Creek canyon. The sun had not yet risen above the mountain tops and the temperature was minus forty degrees, which was not uncommon in the high altitudes, but as the canyon opened out a few miles down, there was warm sunshine.

"From Morrison to Denver, about twenty miles, the journey was by narrow-gauge train, of which there were many in Colorado at that time. Another train ride from Denver brought me to Colorado Springs, my destination, in the late afternoon. . . . Included in my hand luggage was my dental engine, which I had used during my college years, but dismembered for the journey. My broken and crooked pathway had now become a straight line, with no deviations, that was to lead to my life's work."

As a practicing dentist in Colorado Springs in 1908, he became concerned about the prevalence of mottled tooth enamel. Therefore, when G. V. Black, a leader in dental enamel research, came to a meeting of the Colorado State Dental Association as a guest speaker in 1909, Dr. McKay interested him in the tooth mottling problem. From that time on, Dr. McKay contributed perceptive attention, time, energy, and personal resources to fluorosis and water-fluoridation studies in cooperation with fellow researchers and dental health planners.

Comparative studies in two Colorado mining towns and in other communities indicated that the presence or absence of mottling and also of caries varied with differences in drinking-water supplies. Controlled studies demonstrating the relationship between tooth decay and the fluoride content of water supplies soon followed and were repeated in many places under Dr. McKay's energetic leadership.

His interest and activity in this research and in his furtherance of its practical application never lagged, and throughout his life he remained a key figure in the increasingly successful movement toward fluoridation. More than 1,800 cities in the United States now use controlled fluoridation to adjust the fluorides in their water supplies to approximately the optimum level of one part of fluoride per 1 million parts of water. Thirty-five million people live in

*McNeil, Donald R.: The Fight for Fluoridation, New York, 1957, Oxford University Press.

these communities, and 7 million are using naturally fluoridated water. This means that one out of every three persons using water from central water supplies in the United States now drinks water fluoridated by nature or by the community.* Adoption of controlled fluoridation as a preventive dental health measure is continuing to spread in this country and in numerous other countries.

FREDERICK SUMNER MCKAY.

Dr. McKay personally conducted many local studies. He traveled over the United States, making examinations and charting conditions that might bear on mottled enamel and dental caries, and he also made personal examinations and studies in some European countries. In addition, he conducted a voluminous worldwide correspondence regarding dental fluorosis and water fluoridation. His published papers on these subjects, more than forty in all, appeared in professional journals, waterworks journals, and textbooks.

For the most part, Dr. McKay financed his studies from his personal resources. In all the years of his research and leadership, he received only a small grant from the Research Commission of the American Dental Association and the United States Public Health Service, a one-year grant from the City of Colorado Springs, and a grant for traveling expenses (in connection with limited projects) from the American Public Health Association. The great scientific and humanitarian value of his services, however, brought him not only numerous honorary memberships in dental and other professional organizations but also many special awards and honorary degrees.

Dr. McKay was president of the Colorado Springs Dental Society in 1909, the Colorado State Dental Association in 1911, the Eastern Association of

*See *Public Health Reports* 74: 884, October, 1959.

Graduates of the Angle School of Orthodontia in 1930 and 1931, the New York Section of the International Association for Dental Research in 1934 and 1935, and the Colorado Springs Dental Society in 1944. He also served as secretary of the American Society of Orthodontists in 1906; grand master of the New York Auxiliary of Delta Sigma Delta fraternity from 1927 to 1929; consulting specialist in child hygiene for the United States Public Health Service in 1928 and 1929; consultant on Dental Fluorosis for the United States Public Health Service from 1938 on; member of the Board of Editors of the *Journal of Dental Research* from 1929 to 1933; visiting oral surgeon at Presbyterian Hospital in New York City from 1925 to 1930; chairman of the Lord and Chaim Prize Committee, First District Dental Society of New York, from 1932 to 1934; and lecturer in oral hygiene, Colorado State Dental Society, in 1912.

He belonged to the Colorado Springs Dental Society, the Colorado State Dental Association, the American Dental Association, the St. Louis Academy of Dentistry, the Missouri State Dental Association, the American Society of Orthodontists, the Eastern Society of Graduates of the Angle School of Orthodontia, the First District of New York Dental Society, the New York Academy of Dentistry, the American Academy of Periodontology, the American Association for the Advancement of Science, the International Association for Dental Research, and the New York State Dental Society.

Dr. McKay held honorary memberships in the New York City Chapter of the International Association for Dental Research, the Colorado Springs Dental Society, the Colorado State Dental Association, the New York Academy of Dentistry, the American Dental Association, Omicron Kappa Upsilon fraternity, the American College of Dentists, the Rocky Mountain Society of Orthodontists, the American Association of Orthodontists, the Wisconsin State Dental Society, and the American Dental Hygienists Association. In 1957 he was awarded a life membership in Delta Sigma Delta fraternity. Honorary Doctor of Science degrees were conferred upon him by the University of Pennsylvania, Western Reserve University, the University of Colorado, and Colorado College.

Among the medals and awards that Dr. McKay received were the Jarvie Medal from the New York State Dental Society, 1945; the Callahan Medal from the Callahan Memorial Commission, Ohio State Dental Society at Columbus, Ohio, 1949; the Spenadel Medal from the First District of New York Dental Society, 1952; an illuminated scroll from the American Association of Public Health Dentists, 1950; the Lasker Award from the American Public Health Association, 1952; the Florence Sabin Award from the Colorado Public Health Association, 1953; the Award of Merit plaque from the Detroit District Dental Society in commemoration of the completion of ten years of water fluoridation at Grand Rapids, Michigan, the first city in the world to fluoridate its water supply, 1955; an award from the Colorado State Dental Association commemorating the fiftieth year of the study of mottled enamel and water fluoridation, 1958; and Delta Sigma Delta's annual award for distinguished and meritorious service to the dental profession, 1959.

In addition to his many professional activities, Dr. McKay was also interested in music. He was the author of an article entitled "Sacred Hearth—An Important Recurring Musical Phrase in Richard Wagner's 'Ring of the Nibelungs' Not Heretofore Recorded or Established as a 'Leit Motive,' " which was published in 1941 in the Metropolitan Opera Guild's *Opera News*. He was president of the Civic Music Association of Colorado Springs from 1942 to 1944, treasurer of the Colorado State Federation of Music Clubs in 1944, and president of the Colorado Springs Symphony Orchestra Association in 1951 and 1952. He was also a member of the Colorado Springs Music Club and the American Music Society of Colorado Springs.

Dr. McKay is survived by his second wife, Mrs. Honora Bailey Fink McKay, and his two daughters, Mrs. Helen Gertrude Horchler and Mrs. Roberta Henrietta George Lusardi. Another daughter, Virginia Mary Neosho, died in 1951.

Robert Downs

Editorial

WHOSE MAN ARE *YOU?*

THE tendency of some orthodontists to identify themselves with systems of appliance therapy or "cults of treatment," as some have termed them, exerts a deterring influence on orthodontic progress. Such identification tends to diminish the professional status of the orthodontist and to interfere with his service to his patients. The "evangelical" approach in orthodontic practice must give way to the scientific approach if orthodontics is to continue to make progress in practice as well as in theory.

The search for formulas which solve all treatment problems is bound to lead to disappointment as long as we treat living patients, each of whom is a law unto himself. Furthermore, an orthodontist's satellization around a man (whose man he becomes) is an admission of his own impotence in dealing with daily problems as they pertain to the individual patient in his dental chair.

The man whose man the orthodontist becomes may change his mind and may not have the opportunity to inform his disciples. On the contrary, some disciples will not allow the man they follow to change his mind or to make any radical changes in his system, because that would leave them without support.

Systems and cults are traditional in orthodontics. Angle, with his "latest and best" appliance which was preceded by other appliances that he devised, was the forerunner of the "evangelical" approach. Many who refused to follow him blindly were condemned by Angle and his disciples. The dissidents who had the courage of their own convictions then went on to make their own mark in orthodontics; many were, in turn, eventually honored and held in high esteem by their confreres.

The foregoing is not intended to imply that the edgewise appliance was not a great contribution to orthodontic therapy. Great as this appliance was and still is today, however, it is not the same appliance that was originally introduced by Angle. Nor is it used in the same way. It was the dissidents, those who insisted on doing their own thinking, who were responsible for bringing the edgewise and other appliances in current use to their high state of present efficiency.

Another fault of "cultism" is the fact that the statements and theories propounded by the respective adherents, as seen in the orthodontic literature, tend to be mutually exclusive. We are not referring here to differences of opinion. Free expression of opinions, no matter how far apart they may be, is the lifeblood of scientific advancement. We have in mind those situations in

which if one categoric statement is valid the other simply cannot hold true. For example, if light forces are the most favorable for use in orthodontic tooth movement because the labial bone must not be overtaxed, how can we subscribe to "rapid tooth movement"? Light wires may not always be synonymous with light forces, depending on how the light wires are manipulated.

We are not directing attention here against the introduction of new techniques or against techniques per se. Our concern is over the fact that too often many orthodontists are ready to accept new methods on sheer faith rather than on conviction based upon critical acumen backed by independent judgment and personal experience.

The professional man, especially a member of the scientific health professions, must retain an inquiring mind. He cannot afford to have someone else do his thinking for him *in absentia.* He must be his own man.

J. A. S.

Department of Orthodontic Abstracts and Reviews

Edited by
DR. J. A. SALZMANN, NEW YORK CITY

All communications concerning further information about abstracted material and the acceptance of articles or books for consideration in this department should be addressed to Dr. J. A. Salzmann, 654 Madison Avenue, New York.

The Year Book of Dentistry (1959-1960 Year Book Series): Chicago, 1960, The Year Book Publishers, Inc. Illustrated. 479 pages. Price, $7.50.

While orthodontists have an interest in every phase of dentistry, it is worth noting that one-fourth of the 1960 *Year Book* deals directly with orthodontics. Noyes, the editor of the section on orthodontics, points out that interest in facial growth, development of the dentition, and appraisal of the facial profile have received particular attention during the period under review. Many articles on retention, prevention, and interceptive orthodontics are also reviewed. Removable appliances are finding wider usage, and a number of articles on the subject are included.

Electromyography and cephalometrics are also prominent in the literature. articles have been digested on cleft palate orthodontics, habit breaking, and serial extraction. The number of articles on extraoral anchorage is apparently receding. The illustrations and tables will be found interesting. The practicing orthodontist will find here a valuable addition to his library. *J. A. S.*

The Dentition of the Growing Child. A Longitudinal Study of Dental Development Between 3 and 18 Years of Age: By Coenraad F. A. Moorrees. Cambridge, Mass., 1959, Harvard University Press. 245 pages. Illustrated. Price, $5.50.

The data presented in this book were obtained largely from Drs. Harold C. Stuart of Boston, Massachusetts, and Richard H. Stucklen of Wilmington, Delaware. The study itself was supported by a number of organizations—mainly the United States General Education Board, in the early years, and more recently the Research Grants Division of the United States Public Health Service.

A summary review of the literature on growth and developmental changes of the dentition is presented. The author points out that, because of limitations imposed by the available data, these findings cannot be correlated with changes of the jaws or with somatic development. This criticism applies also to the present study. Methods are presented for determining norms of dental development, including mesiodistal crown diameters, size of the dental arches, and spacing and crowding of the teeth.

With regard to prediction of dental development, Moorrees found that the pattern of dental growth is peculiar to the individual and may deviate from that of the group to a marked extent. No predictions can be made from measurements in the deciduous dentition with respect to the permanent dentition. The general statement can be made, however, that development of the permanent dentition may be similar to that of the deciduous dentition and

then again it may not. The individual child shows such wide variation that it is virtually impossible to predict the occlusion of the permanent dentition from that of the deciduous dentition.

The main value of observing children during the period of transition from the primary dentition to the permanent dentition, from a clinical standpoint, is that it affords the orthodontist an opportunity to prevent and intercept malocclusion in its incipiency. Valuable statistical tables are included, and significant bibliographic references are provided. *J. A. S.*

The Mouth. Its Clinical Appraisal: By A. B. Riffle, D.D.S., Formerly Chief of the Dental Service at the Rochester General Hospital; member of the American Academy of Periodontology. Philadelphia, 1959, J. B. Lippincott Company. 118 pages. Illustrated. Price, $3.50.

The author recognizes that diseases of the mouth are as yet in an area which falls between the jurisdiction of the physician and that of the dentist. The present text presents a brief technique for practical interpretation and background explanations of conditions frequently met in the examination of the oral cavity. It is advised that during examination of the mouth attention should be given to the appearance and texture of the entire mucosa and not just of the alveolar processes.

Many pathologic conditions are described and illustrated. Among the topics discussed are stomatitis, pigmentation, and foul breath. The detection of malignancies is described. The indications for the use of various drugs are mentioned. It is pointed out that adolescence is the period of greatest dental disturbances, possibly because the recent eruption of teeth has presented many susceptible areas. It is probable, also, that hormonal disturbances are at least partially responsible.

With respect to orthodontics, the author directs his remarks mainly to the physician. However, the discussion should be useful to the practicing orthodontist when he is faced with a similar situation. *J. A. S.*

Note on Conventions Used in the Legends for the Illustrations: *J. Mount Sinai Hospital* **27**: 103, March-April, 1960.

The legends that accompany illustrations should specify the patient's position when the film was taken, that is, prone, supine, or erect. In each instance, however, the film is presented for viewing as if the reader is looking at the front of the patient. In other words, the right side of the patient is to the left of the reader and vice versa. In the descriptive portions of legends, when "right" is mentioned reference is made to the right side of the patient and not to the right side of the reader. Similarly, the terms "medial" or "mesial" and "lateral" refer to the midline of the patient. The reproductions should have the same tones as the original film, that is, a black area in the original film is also black in the illustration. When an "increase in density" is mentioned, this refers to an area in the illustration which is whiter than would be anticipated. Areas in illustrations and in original films which are blacker or darker are referred to as more "lucent" regions. This method of designation is consistent with the degree of absorption of the x-ray beam in the various portions of the body; a whiter area ("increase in density") refers to an area of greater x-ray absorption in the body and a darker area ("decrease in density") refers to an area of diminished x-ray absorption. The term "density," used in this fashion, does not refer to the physical density of the film.

A Clinical Analysis of Orofacial Morphology and Behaviour of 500 Patients Attending an Upper Respiratory Research Clinic: By H. L. Leech. *D. Practitioner* 9: 57-68, December, 1958.

Many concepts of orthodontic thinking (for example, the relationship of ear, nose, and throat disorders to orthodontic irregularities) have been generally accepted.

The author studied 500 patients attending the Upper Respiratory Research Clinic for Diseases of the Ear, Nose, and Throat. They were not selected for orthodontic purposes, and therefore the results of the research are more applicable to the general population as a whole. The clinical examination was supported by the lateral and occipitomental radiographs normally taken for ear, nose, and throat purposes; no cephalostat was available for the lateral radiographs, and no tracings were made.

Angle's classification of the anteroposterior relationship of the teeth was used. The relationship between the upper and lower buccal teeth in their original position of eruption in soft tissue balance was used, and allowances were made for changes in molar position due to premature loss of deciduous teeth. Because of the mobility of the dentoalveolar structures on relatively fixed bases, the Angle classification does not necessarily coincide with the skeletal classification.

The majority of patients had a mixed dentition. The patients ranged in age from 2 to 13 years, and the average age was 7 years. The distribution of boys and girls was fairly even.

In the Angle classification there were about twice as many Class I as Class II, Division 1 cases and more than twice as many Class II, Division 1 cases as there were Class II, Division 2 or Class III cases. Birth weights were not found to be lower in patients with Class II malocclusions. The author did not find children with Class II malocclusion to be physically inferior.

Forty-three per cent of the children had some form of atypical swallowing pattern. This abnormality was characterized by (1) a contraction of the circumoral musculature with the lower lip passing either over or under the upper incisors, (2) a thrust of the tongue forward between the upper and lower incisors with the buccal teeth apart or in occlusion, or (3) both lip contraction and tongue-thrust.

Ten per cent of the children had both a tongue-thrust and circumoral contraction, 25 per cent had a tongue-thrust alone, and 8 per cent had a circumoral contraction alone. About one-third of the total number of Class I patients, two-thirds of the Class II, and one-third of the Class III patients had atypical swallowing patterns.

The large number of atypical swallowers seen among Class II patients is probably due to the fact that the lips associated with these postnormal bases are more incompetent and that most people with incompetent lips approximate them by contraction of the circumoral and mentalis muscles on swallowing. Consequently, many of the abnormal soft-tissue behavior patterns in these cases are probably the result of the abnormal skeletal pattern; this may be merely an associated factor and not necessarily the cause of the malocclusion. The high figure is also probably due to the fact that I have included in the group of abnormal swallowers patients who have circumoral contraction alone (without tongue-thrusting).

Only in Class I cases can this abnormality of the soft tissue be the sole or main cause of an abnormal incisor relationship, which was an increased incisor overjet and reduced overbite or both, the tongue-thrust and lip contraction enhancing one another.

Generally speaking, where the overjet was normal the overbite was reduced, and where the overbite was normal the overjet increased. With premature loss of the deciduous molars in the lower jaw, the retroclination of the lower incisors by the circumoral contraction appeared more marked. In a few cases there was a Class II, Division 2 type of malocclusion, with the circumoral contraction retroclining both the upper and lower incisors, and yet a slightly increased overjet was maintained by the tongue-thrust. There appeared to be no direct evidence that a greater number of atypical swallowing patterns was associated with lack of breast-feeding.

Thirty-seven of the 500 patients (just over 7 per cent of the total group) had an anterior interdental sigmatism or lisp. Most of these patients had an associated tongue-thrust and reduced incisor overbite, increased overjet, or both. Four patients with an interdental sigmatism had normal swallows and a normal incisor relationship.

Less than one-third of those patients whose lips were habitually apart were mouth-breathers, at least during the daytime. This was due, as explained in 1948 by Gwynne-Evans and Ballard, to the fact that although the anterior oral sphincter (the lips) was open, the posterior oral sphincter was closed by approximation of the soft palate with the base of the tongue. Mouth breathing ensued only if there was an obstruction to a free nasal or postnasal airway, in which case the tongue dropped away from the soft palate. Removal of the obstruction resulted in a return to nasal breathing, but the lips, of course, remained apart because they were basically incompetent. Practically all those with this "lips-apart" posture closed the lips by circumoral contraction on swallowing.

A slightly higher number of large adenoids was associated with Class II than with Class I or Class III. The proportion is small, and it would be unwise to suggest a cause-and-effect relationship between large adenoids and the skeletal pattern. Large adenoids are not the prerogative of Class II, Division 1 patients, as is sometimes thought, but more, if anything, of Class II, Division 2 patients. Only 10 per cent of those with large adenoids had a definitely narrow maxilla. In only one-fifth of these cases did large adenoids so completely obstruct the postnasal airway as to cause true mouth breathing.

The method of testing for mouth breathing was to notice the condensation of the breath on two cold metal tongue spatulas, one placed under the nose and the other in front of the mouth.

Mouth breathing does not seem to affect the skeletal or occlusal pattern. The width of the jaws similarly is unaffected, as out of the ninety-five of the total group who had definitely narrow jaws only eighteen were mouth-breathers.

Twenty-one out of 500 (approximately 4 per cent) had an anterior open-bite, and these were distributed with respect to skeletal pattern very much like the total distribution. The ages ranged from 3½ to 8 years.

All had an atypical swallowing pattern with a tongue-thrust, and nine out of the twenty-one an anterior interdental sigmatism. Just over one-half were sucking a dummy or a thumb at the time of investigation. In many cases the tongue rested permanently between the upper and lower incisors and against the lower lip. Support is given to the belief that anterior open-bites are usually due to a form of obstruction to the vertical development of the incisors, be it dummy, thumb, tongue, or a combination of these factors. In three of the twenty-one patients there were no obvious obstructive causes, but the patients had a high Frankfort-mandibular plane angle with a consequently much greater vertical height in the anterior region than in the posterior region.

Nineteen per cent (ninety-six out of 500) sucked their fingers or thumbs at one time or another. The average age for this group was 7 years, the eldest

being 12 and the youngest 3, with a slightly higher proportion among the boys. All but one had sucked for at least two years. About one-half were still sucking at 6 years of age. Roughly two-thirds had ceased at the time of eruption of the permanent incisors. Thus, about 6 per cent of the total of 500 were still sucking at 8 years of age. The habit does not affect the skeletal pattern. The occlusion of the teeth is affected with a proportionate preponderance of Class II, Division 1 malocclusions. Of those of all ages who were still sucking, about two-thirds had a tongue-thrust.

The habit seems to affect the occlusion only (not the skeletal pattern), and where the incisors are affected, there is nearly always an associated tongue-thrust. It is not known whether the thumb or the tongue plays the dominant role, but it is probable that they enhance one another. In the realm of malocclusion, the author would put thumb-sucking very low down in the etiological scale. There is no relationship between the habit and lack of breast feeding.

There are far more "close-bites" on skeletal Class II bases, and, compared with the total group of 500, there are also far more in the Class II, Division 2 than on the Class II, Division 1 malocclusions.

Only one-fourteenth of the increased incisor overbites showed an overclosure of the mandible from the rest position to the occlusal position. Allowing for a clinical error of as much as 50 per cent, this figure would still be very small.

There was a slight tendency for the Frankfort-mandibular plane angle to be low with increased and normal overbites and high with reduced overbites. This may be associated with a tendency for the lips to be more competent on low Frankfort-mandibular plane angles.

Most increased incisor overbites are not due to overclosure of the mandible (that is, true close-bites); they are due to an abnormal incisor relationship when either the upper or lower incisors, or both, are on a different occlusal level than the buccal teeth (where present).

Early loss of deciduous teeth in the mandible does not necessarily cause an overclosure, but it allows the lower incisors to become retroclined and lose their normal contact with the upper incisors. This is evident from the fact that early loss in the maxilla does not result in a close bite (that is, due to overclosure). An abnormal incisor relationship will not necessarily give rise to a close-bite if the tongue, thumb, or high Frankfort-mandibular angle prevents it. It is possible to have an overclosure of the mandible (where there is a large freeway space) without a close-bite if the incisor relationship is normal.

Complete Dental Care of the Hemophiliac: By Benjamin Rubin, Paul Levine, D.D.S., and Martin C. Rosenthal. *Oral Surg., Oral Med. & Oral Path.* **12**: 665-675, June, 1959.

Any dentist who is treating a hemophiliac should at all times be in contact with the patient's hematologist and family physician. The dentist should recognize that some dental procedures must be carried out in a hospital, whereas others may be performed in the dental office. Preventive treatment is much simpler and a great deal easier to perform than involved restorative procedures which create anxiety for both the dentist and the patient. Emergency treatment should be held to a minimum.

At the present time there are three recognized categories of hemophilia: (1) AHG, a deficiency of antihemophilic globulin; (2) PTC, a deficiency of plasma thromboplastin component; and (3) PTA, a deficiency of plasma thromboplastin antecedent. The PTC and PTA hemophilias are relatively milder than the AHG type.

Before treatment is begun, the hemophilic patient should have been thoroughly evaluated by a hematologist as to type of hemophilia, relative degree of severity, response to plasma, and any other pertinent factors, and whether the patient should be handled in the routine way for a hemophiliac or whether special considerations are involved. There are hemophiliacs who, for unknown reasons, have become unresponsive and no longer respond to plasma or blood, as would an average hemophiliac. In such cases one must either defer any traumatic treatment, if the condition is temporary, or, if the condition is permanent, modify the treatment so that it will be as atraumatic as possible. A complete roentgenographic work-up and history are obtained. The history should include the following:

(a) *Type of diet:* Soft diet? High carbohydrate? Fresh fruits and vegetables?

(b) *Oral hygiene and routine home care:* Hard brush? How often brushing? When last seen by dentist, and how often seen in last two years?

(c) *Previous bleeding episodes generally:* Joint bleeding? Soft tissue bleeding? Bleeding due to trauma? Easy to control? Special consideration?

(d) *Previous tooth exfoliation routine:* When were deciduous teeth lost? Any overretained? Bleeding? How long?

(e) *Previous experience with regard to extractions and surgery:* Any teeth extracted? Any bleeding? How long? How much plasma necessary? Secondary hemorrhage, etc.?

(f) *Past dental experiences:* How often treated? What type of treatment?

(g) *Patient's reaction to dentistry:* Simple to treat? Much pain involved? Any other discomfort?

Routine care should consist of periodontics, operative dentistry, surgery, endodontics, and prosthetics. The commonly accepted procedures of scaling, curettage, and gingival resection must be obviated in the case of a hemophiliac. These would institute bleeding which would be difficult to control if only because of the area involved.

Adjusting the occlusion by grinding to reduce prematurities and to remove any traumatic occlusion is a necessity. The teeth should then be polished with fine rubber wheels and sandpaper disks and finished by going over all surfaces with pumice and a rubber cup.

Many patients, because of their poor dental condition, make an inferior selection of foods and, because of their fear of inducing bleeding, hesitate to brush their teeth. A diet should be suggested which is low in carbohydrates, high in protein, and moderate in fats. Any good diet which features fresh fruit, fresh vegetables, grain breads (such as whole wheat or rye), fresh meats, eggs, fruit juices, and milk is usually adequate. Patients should avoid sweets, starchy foods, and soft, gummy foods.

In most cases a modified Stillman toothbrushing technique is taught, care being taken to show patients how not to abrade the gingivae. At other times the patient may employ a very soft brush, using a powerful random motion, when he finds that he has a tendency to bleed. Where there is marked periodontal inflammation and infection, or where spontaneous hemorrhage is apparent, it is sometimes necessary to hospitalize the patient and premedicate with plasma before treatment. Obtudents are used, as well as the new local anesthetic sprays, if only for the numbing sensation that the patient feels.

Amalgam should be used in posterior teeth and anywhere else possible. With interproximal fillings, it is suggested that the filling margin end above the gingiva. It is inadvisable to place matrices and wedges subgingivally, as they

can produce bleeding. When caries extend subgingivally to any degree, plastic fillings can be placed by the Nealon or "paint-in" method. This method reduces finishing of the restoration to a minimum and avoids strips and matrices. In the anterior teeth, plastic or synthetic porcelain fillings are used almost exclusively, keeping away from the gingivae as much as possible.

In many hemophiliacs primary tooth exfoliation occurs over a fairly lengthy period, with much oozing. Often bleeding will continue over a period of two or more weeks, occasionally with intervals of no bleeding. It is usually best to wait for Nature to cause complete exfoliation. However, if during the course of the exfoliation the patient loses so much blood due to the oozing that it becomes necessary to transfuse, the offending tooth or teeth may be extracted at this time while the patient's hemostatic defect is corrected. To reduce the oozing as the tooth loosens, it has been suggested that any one or a combination of the following be used: ice, pressure, topical application of Adrenalin, sucking teabags, Hot-R-Cold Pak, Oxycel, liquid thrombin applications, or any remedial measure which may be found in the home. These measures are occasionally necessary even after the tooth has dropped out, and they may be applied to the raw socket. If the bleeding is severe, transfusion may be necessary for hemostasis.

In many cases deciduous teeth are overretained. Extraction of these teeth is not indicated, for natural exfoliation is less traumatic. If the permanent teeth are in danger of being locked out of occlusion, however, or if it appears that the teeth will be overretained for years, then extraction is indicated and performed as for any extraction in a hemophiliac.

Endodontics not only enables the patient to retain needed teeth but, of equal importance, it makes it possible to avoid extractions in many cases. In cases in which the pulp is exposed and tissue is vital, the tooth may be treated with pulp capping or carried along for one year or more by means of zinc oxide-eugenol dressings, which are changed when necessary, until the tissue becomes nonvital. Care is taken not to instrument past the apex, as this may cause bleeding which is difficult to control and which makes it impossible to obtain a dry canal for filling purposes. It is possible to cause bleeding in the apical tissue, so that when the canal is sealed the bleeding will back up.

In order to completely avoid, or at least to minimize, some of the extraction problems, certain essential restrictions have been imposed in fashioning a surgical technique. Not more than two teeth should be extracted at one time, and these should be adjoining or at least in the same quadrant of the jaw. This simplifies the surgeon's task of applying pressure to the area, insertion of hemostatics into the sockets, and obtaining fixation and immobilization of the injured parts.

Only those patients who have been cleared as good risks by the hematologist should be chosen as candidates for surgery. The minimal laboratory procedures to determine a patient's eligibility are complete blood count, complete blood typing with screening for isosensitization, prothrombin time, coagulation time, and prothrombin consumption. In addition, each patient is identified as to the type of hemophilia present and an in vitro plasma responsiveness determination is made.

If the hematologist has determined that the patient is incorrectible, or in any other way physically unfit, he should advise that the extraction not be performed. The dentist should recommend surgery only for those patients in whom the procedure was necessary and in whom no conservative treatment is feasible. Some of the conditions included in this category are acute alveolar abscesses; overretained deciduous teeth locking permanent successors out of the line of occlusion; jagged, broken-down, carious teeth which are abrading gingiva, tongue, or cheek; cariously exposed teeth not suitable for endodontic therapy and exhibiting a severe pulpitis; and other accidental traumatic injuries to the mouth or lips.

(Orthodontic treatment which involves banding teeth should be avoided when possible. I have treated hemophiliacs for the correction of malocclusion by using activator [Andresen] appliances. While the results may not be as quickly obtained and the patient may not receive the high degree of correction of the malocclusion at which American orthodontists aim, the avoidance of the hemorrhage that may ensue when orthodontic bands are being placed makes this the method of choice.) *J. A. S.*

Electromyographic Analyses of the Temporal and Masseter Muscles During Function of Different Orthodontic Appliances: By H. Bjørg. *Norske Tandl. Tid.* **70**: 85-103, March, 1960.

Earlier investigators have recorded abnormal activity of the temporal muscle in cases of malocclusion. The purpose of the present investigation was to observe to what extent orthodontic appliances may change the neuromuscular pattern. The recording apparatus was the Grass electroencephalograph with eight surface bipolar electrodes. The temporal and masseter muscles were recorded in three cases of distoclusion. The skeletal pattern (based upon Björk's cephalometric analysis) revealed a retruded mandible in two cases and dentoalveolar deviations in the third case. The following appliances were inserted: fixed appliances with intermaxillary elastics (each exerting 130 g.), Bimler's elastic functional appliance, and Andresen's activator.

1. Increased activity of posture was recorded after insertion of the above-mentioned appliances, but mainly in the posterior temporal fibers. In the cases of retruded mandible, no muscle activity was found in the masseter muscle with the same appliances.

2. Bite pressure on Andresen's activator and Bimler's elastic functional appliance changed the balance of activity to the anterior temporal fibers and the masseter muscle. This change in the muscle activity could not be observed during bite pressure with the fixed appliances and 130 g. intermaxillary elastics in the cases of retruded mandible.

3. The records of cases treated with Bimler's elastic functional appliance demonstrated lower muscle action potentials as compared to Andresen's activator; 130 g. intermaxillary elastics seemed to promote the highest spikes.

A Biologist Looks at the Sella Point: By Prof. Louis J. Baume. *Tr. European Orthodontic Society, 1957.*

Each skeletal unit or bone develops in size and in structure due to coordinated processes of bone formation and bone resorption. Development in internal structure or modelling transformation proceeds continuously throughout life and results under the influence of function in a distinct architectural arrangement of shell bone and spongy bone.

Development in size or morphogenesis is limited in time as it terminates with bone maturation. Skeletal morphogenesis is effected by two different histogenic processes—endochondral ossification and intramembranous ossification.

Endochondral ossification at epiphyseal and articular cartilages engenders elongation of bones independently of adhering or investing organs. It is controlled by genetic, metabolic, and hormonal factors. As bone tissue per se is unable to grow interstitially, the cartilage takes over this intermediary role. By acting as a wedge, endochondral ossification effects the lengthening and widening of the bone.

Intramembranous ossification in the periosteum and sutures is engendered by a process of induction originating from the increase in volume of neighboring or investing organs. Important inductors of membrane bones are the

muscles, such as the masticatory musculature, the tongue or the developing tooth buds in facial bone growth, the brain in cranial bone development, and for both, above all, the cartilage centers of endochondral ossification. Membrane bones increase in size through periosteal activity; however, this activity is not autonomous, like endochondral ossification, but is conditioned by the induction of expanding neighboring organs.

The term "growth center," in the strict sense of the word, therefore, should be applied exclusively to the cartilage apparatus of endochondral ossification, while sutures and periosteum may be called potential or actual growth sites, depending upon the induction from adjoining or investing organs.

The growth centers of the cranial base are represented by two sites of endochondral ossification—the synchondrosis sphenooccipitalis and the synchondrosis presphenoideo-basisphenoidalis. Sella turcica as a superstructure of the basisphenoidal bone is thus located between two growth centers. Hence, the topograhic relationship of sella to the entire cranial base and the skull in toto will depend upon the rate of activity of each of these centers. Assessing this activity by both histologic and experimental methods, the author was able to establish the following principles:

1. The basicranial synchondroses perform the same histogenic function as the epiphyseal cartilages. Their growth mechanism, however, shows an important difference. While epiphyseal cartilages proliferate in only one direction, the diaphyseal, the basicranial synchondroses proliferate in both directions, so that new bone is formed at both ends of the cartilage disc.

2. The growth activity of the synchondroses induces the development of the membrane bones of the brain case and face. Achondroplastic dogs, such as the bulldog and the Brussels griffon, as well as achondroplastic human beings, demonstrate the marked stunting of facial development due to lack of induction by the missing cartilage growth centers.

3. The activity of the basicranial synchondroses is governed by genetic and endocrine factors.

Genetic factors determine the period of patency and fusion; they are responsible for generic and racial differences in skull morphology. The rat has permanently patent synchondroses. In monkeys and apes the presphenoideo-basisphenoidal synchondrosis fuses after eruption of the premolars and canines, while in white man closure occurs before birth and in prognathic Negroes it takes place somewhat later. The sphenooccipital synchondrosis disappears in apes and in man at about the corresponding ages of 18 to 20 human years.

Endocrine factors controlling synchondrosal activity determine the constitutional stigmas of craniofacial morphology. By means of endocrine experiments the author was able to change at will facial angulation and cranial indices in laboratory animals. Distoclusion and brachycephaly were produced in hypophysectomized rats by treating them with growth hormone. The mechanism consisted of a selective activation of the presphenoideo-basisphenoidal synchondrosis.

Prognathism and dolichocephaly result from a prolonged activity of the cranial growth centers under stimulation of the pituitary growth hormone.

Brachycephaly and hypognathism are the consequences of an early arrest of basicranial growth under the maturing effect of the thyroid and gonads.

4. There is histologic evidence of continuous bone transformation at the hypophyseal groove and the clinoid processes of sella turcica. Modelling resorption and reparative apposition also prevail at the "frontal base line" of De Coster, including the sphenoid plane and the cribriform plate. This is

indicative of a topographic independence of the pituitary gland and the frontal lobe of the brain relative to its bony support. Remodelling processes at the hypophyseal and cerebral surfaces of the cranial base are particularly marked in the adolescent rhesus monkey following cessation of growth activity in the presphenoideo-basisphenoidal center.

The position of sella relative to the cranial base, therefore, may be compared with a drifting boat in a river. This is also true for any other landmark situated anterior or posterior to an active cartilage growth center.

The question as to the usefulness of the sella point in roentgenographic cephalometry may be answered on the basis of the following experimental evidence obtained:

1. Sella point in man is situated anterior to the main growth center of the skull, namely, the sphenooccipital synchondrosis. While the presphenoideo-basisphenoidal synchondrosis fuses around birth, the sphenooccipital synchondrosis is one of the last cartilaginous growth apparatuses in the skeleton to disappear. Rate and cessation of the activities of both have a bearing upon the degree of facial angulation, cranial index, and even type of occlusion.

2. Bipolar endochondral osteogenesis of the sphenooccipital synchondrosis at both the proximal end of the occipital bone and the distal end of the sphenoidal bone effects a forward thrust of the cranial base, including the attached facial complex.

3. The significance of the basicranial synchondrosis, furthermore, stems from the fact that growth of all facial and cranial membrane bones depends upon the inductive stimulus of this growth apparatus.

4. Rate and duration of endochondral activity are controlled hormonally and therefore are subject to individual variation; hence, any quantitative growth assessment on an average sample basis is prone to grave errors. Individual variance, not constancy, characterizes the craniofacial growth pattern in man. Constitutional variability must be taken into consideration when therapeutic effects are to be interpolated from serial roentgenograms.

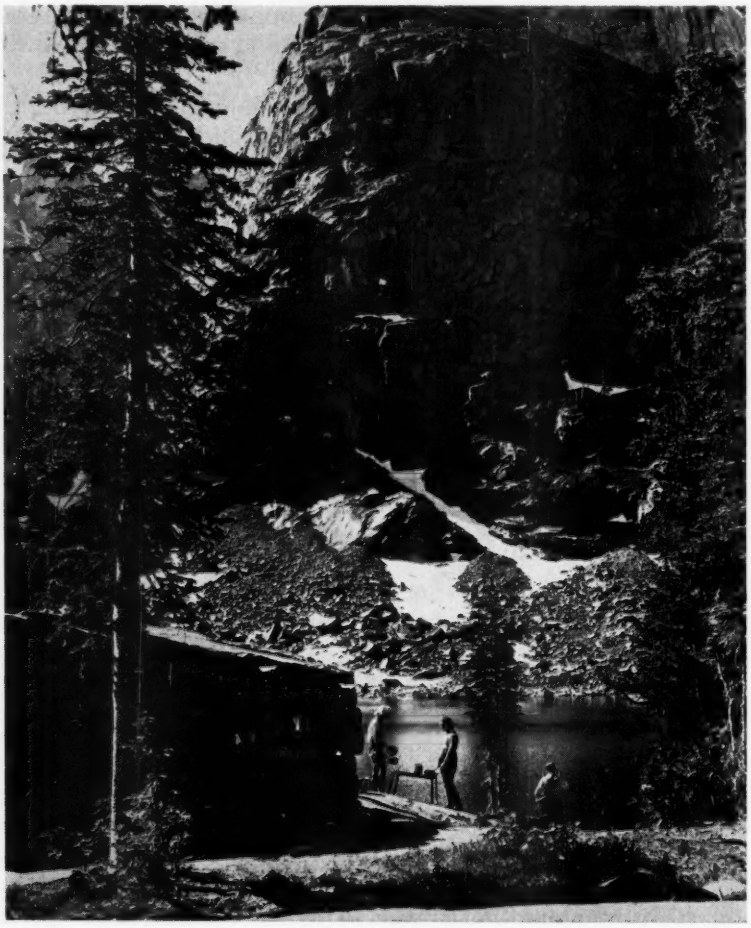
5. The position of sella and any other superstructure of the cranial base is determined by the growth pattern of the investing organ, namely, the brain stem with its adhering pituitary gland. Caught by the growth momentum of the supporting cranial base and the investing pituitary gland, sella can by no means be considered a stable point of reference in growth studies.

News and Notes

American Association of Orthodontists

The next annual meeting of the American Association of Orthodontists will be held April 16 to 21, 1961, in the mile-high city of Denver, Colorado. The Denver Hilton Hotel will be the headquarters for the meeting.

More detailed information concerning the meeting will be published in forthcoming issues of the JOURNAL.



Colorado Visitors Bureau, Photo by O. Roach.

Refreshing Colorado is the place for family fun, month in and month out, year in and year out. Here a group relaxes on the shores of a sylvan lake in the shadow of spectacular Lone Eagle Peak, deep in the heart of the Rocky Mountains.

American Board of Orthodontics

The next meeting of the American Board of Orthodontics will be held at the Denver Hilton Hotel in Denver, Colorado, April 10 to 15, 1961. Orthodontists who desire to be certified by the Board may obtain application blanks from the secretary, Dr. Alton W. Moore, University of Washington School of Dentistry, Seattle 5, Washington.

Applications for acceptance at the Denver meeting, leading to stipulation of examination requirements for the following year, must be filed before March 1, 1961. To be eligible, an applicant must have been an *active* member of the American Association of Orthodontists for at least two years.

Colorado Visitors Bureau, Photo by O. Roach.

Pike's Peak, Colorado's best-known mountain, as seen from the Garden of the Gods near Colorado Springs. Back in 1806, Lt. Zebulon M. Pike said that the 14,110 foot peak would never be scaled. Nevertheless, thousands of vacationers each summer drive comfortably and safely on a well-maintained highway to the top, while other thousands enjoy a trip to the top by cog railway or in buses. The highway usually is opened by mid-May and remains open until snows close it in October.

American Board of Orthodontics Information Booklet

The A. B. O. booklet of information, including the list of certified orthodontists for the years 1960-1961, is now off the press and is available. The booklet outlines the origin of the American Board of Orthodontics and indicates who may apply for certification, the definition of preceptorship, examinations for same, and the purposes of the A. B. O. Added to the above is a review of the Albert Ketcham Memorial that was established by the

American Board of Orthodontics in collaboration with the American Association of Orthodontists. The names of certified specialists for all time are listed, state by state. In addition to that listing are the list of directors constituting the American Board for all time and a list of those who have received the Ketcham Award since the Award was established in 1936.

The current directors of the American Board of Orthodontics are as follows:

President, Wendell L. Wylie _ _ _ _ _ _ _ _ University of California School of Dentistry, San Francisco, Calif.
Vice-President, J. A. Salzmann _ _ _ _ _ _ _ _ _ 654 Madison Ave., New York, N. Y.
Secretary, Alton W. Moore _ _ University of Washington School of Dentistry, Seattle, Wash.
Treasurer, Paul V. Reid _ _ _ _ _ _ _ _ _ 1501 Medical Arts Bldg., Philadelphia, Pa.
Historian, B. F. Dewel _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ 708 Church St., Evanston, Ill.
Director, Frank P. Bowyer _ _ _ _ _ _ _ _ _ 608 Medical Arts Bldg., Knoxville, Tenn.
Director, Nathan G. Gaston _ _ _ _ _ _ _ _ _ _ _ _ _ 701 Walnut St., Monroe, La.

Central Section of the American Association of Orthodontists

The Central Section of the A. A. O. will hold its annual meeting Sept. 18 to 20, 1960, at the Park Plaza Hotel in St. Louis, Missouri. The scientific program follows.

Monday, September 19

Different Types of Anchorage Used With the Twin Wire Mechanism. Joseph E. Johnson, Louisville, Kentucky.
Case Report. Charles M. Taylor, Crockett, Texas.
The Problem of the Rotated Maxillary First Permanent Molar. Frank F. Lamons, Atlanta, Georgia.
Practice Administration in Orthodontics. C. Edward Martinek, Detroit, Michigan.

Tuesday, September 20

Putting Cephalometric Films to Work; Two Time-Saving Techniques. Raymond C. Thurow, Madison, Wisconsin.
Orthodontics as Practiced in Australia. Robert Y. Norton, Sydney, Australia.
Case Report. Fay O. Wardlaw, Little Rock, Arkansas.

Great Lakes Society of Orthodontists

The Great Lakes Society will hold its thirty-first annual meeting Nov. 27 to 30, 1960, at the Netherland Hilton Hotel in Cincinnati, Ohio.

The following essayists will participate:

Cecil Steiner	Beverly Hills, California
David Hamilton	New Castle, Pennsylvania
Robert Moyer	Ann Arbor, Michigan
Sidney Asher	Chicago, Illinois
Robert Ponitz	Ann Arbor, Michigan
Samuel Ackerman	Cincinnati, Ohio
Joseph Jarabak	Gary, Indiana

Social aspects of the meeting will include the following:

Sunday, November 27
Informal Cocktail Hour.
Party at Beverly Hills Country Club (the showplace of the nation).

Monday, November 28

Society Breakfast.

Fellowship Luncheon (W. R. Humphrey, speaker).

"Over the Rhine" Party.

Tuesday, November 29

American Board of Orthodontics Breakfast (Ed Martinek, speaker).

Past Presidents' Luncheon.

"Chuck Wagon Jamboree" Luncheon (for the ladies).

President's Reception and Ball.

Middle Atlantic Society of Orthodontists

The ninth annual meeting of the Middle Atlantic Society of Orthodontists will be held Oct. 9 to 11, 1960, at the Chalfonte-Haddon Hall Hotel in Atlantic City, New Jersey.

Highlights of the program include an address by William R. Humphrey, president of the American Association of Orthodontists; the President's Reception; a dinner-dance honoring President and Mrs. Kyrle Preis, with music by Harold Ferrin and his orchestra; and a luncheon honoring A.A.O. President William R. Humphrey. The scientific program will include the following:

Routine Use of Minute Forces; Also Early Extraction of Second Permanent Molars in Orthodontic Treatment. Holly Halderson.

Treatment Timing. William S. Brandhorst, Jr.

Open-Bite. William H. Oliver.

The Bull Technique. William R. Joule.

The European Concept in Orthodontics. Herr Professor Dr. Hans Karlweis von Muenchen.

Panel Discussion. George Anderson (moderator), Holly Halderson, William H. Oliver, William S. Brandhorst, Jr., William R. Joule, and Hans Karlweis von Muenchen.

The following table clinics will be presented:

1. William S. Brandhorst, Jr. Supplementary to essay.
2. Lawrence F. Graves. A Convenient Band Formation and Placement Technique for an Edgewise Strap-up.
3. Holly Halderson. Supplementary to essay.
4. Francis Hynes. Retraction of Anterior Teeth With Edgewise Mechanism.
5. H. Branin Jaggard. Canine Problems.
6. Elizabeth Kassab. Diagnosis and Treatment Planning for the Young Orthodontist.
7. Walter Mosmann. Elastic Thread as an Adjunct in Orthodontic Therapy.
8. J. Henry O'Hern, Jr. An Appliance Used in Treating Open-Bite Cases.
9. William H. Oliver. Supplementary to essay.
10. Willis F. Sage. Treatment Procedures Involved in the Begg Technique.
11. William J. Conley. Distal Movement of Mandibular Molars.
12. Lewis C. Toomey. Office Procedure—No Bills.
13. Louis I. Keren. Extraoral Therapy.
14. Jerome S. Cullen. New Horizons in Band Formation—Electroform Bands.

15. Clinical Demonstration by Graduate Students, Graduate School, Temple University School of Dentistry.
16. Clinical Demonstration by Graduate Students, Orthodontic Department, Graduate School of Medicine, University of Pennsylvania.

Southwestern Society of Orthodontists

The fortieth annual meeting of the Southwestern Society of Orthodontists will be held at the Town House Hotel in Kansas City, Kansas, Sept. 25 to 28, 1960. A program outline follows.

Sunday, September 25

9 A.M to 5 P.M	Registration, Town House Hotel Lobby.
8:30 A.M.	Golf Tournament, Milburn Country Club.
8:30 A.M.	Skeet Tournament, Elliott Shooting Park.
6 to 8 P.M.	Reception, Town House Hotel.

Monday, September 26

8:30 A.M.	Registration, Lower Lobby.
9 A.M.	Meeting called to order by John W. Richmond, President, Southwestern Society of Orthodontists.
10 A.M.	ORTHODONTIC TREATMENT PLANNING. William L. Wilson, Boston, Massachusetts.
12 Noon	Luncheon and Business Meeting *(Members Only)*.
2 P.M.	Presentation of the Martin Dewey Memorial Award of the Southwestern Society of Orthodontists. *Presiding:* J. Victor Benton and Marion A. Flesher. *Recipients:* H. Carlyle Pollock, Sr., St. Louis, Missouri, and William B. Stevenson, Amarillo, Texas.
3 P.M.	USE OF LABIAL-LOOP-LINGUAL APPLIANCE, CLASS II CASES. William L. Wilson, Boston, Massachusetts.
8 P.M.	Group Baseball Game. Kansas City Athletics versus Cleveland Indians. (Transportation provided.)

Tuesday, September 27

9 A.M.	PROSTHODONTIC–ORTHODONTIC PROCEDURES INVOLVED IN CLEFT PALATE REHABILITATION. Arthur F. Lindquist, Jr., School of Dentistry, The University of Kansas City, Kansas City, Missouri.
10 A.M.	A DENTAL EDUCATOR VIEWS ORTHODONTIC EDUCATION. Hamilton B. G. Robinson, Dean, School of Dentistry, The University of Kansas City, Kansas City, Missouri.
11 A.M.	USE OF LABIAL-LOOP-LINGUAL APPLIANCE, CLASS III BORDERLINE CASES. William L. Wilson, Boston, Massachusetts.
12 Noon	Luncheon *(Members Only)*.
2 P.M.	PROBLEMS AND PITFALLS IN ORTHODONTIC TREATMENT. William L. Wilson, Boston, Massachusetts.
3 P.M.	Open Discussion.
6:30 P.M.	Reception and Dinner Dance Honoring President and Mrs. John W. Richmond.

Wednesday, September 28

8 A.M.	Breakfast, Business Meeting, and Installation of Officers.
9:30 A.M.	General Table Clinics (progressive attendance).
11:30 A.M.	Adjournment. Board of Directors meeting immediately following adjournment.

Ladies' entertainment will include a luncheon on Tuesday, September 27, at the famous Nelson Art Gallery and Atkins Museum, with a guided tour of the Galleries. Transportation will be provided from the Town House Hotel.

American Dental Association

A prepaid union dental care program has been pronounced a success by dentists, patients, and the union after three years, according to an article in the August, 1960, issue of *The Journal of the American Dental Association.*

The plan is operated by the Oregon State Dental Association for the children of members of the International Longshoremen's and Warehousemen's Union and Pacific Maritime Association (ILWU-PMA). Approximately 2,300 children and 355 dentists are involved in the Oregon plan, which is operated through the Oregon Dental Service Corporation set up by the dental society.

Dr. William W. Howard, Portland, Oregon, president of the service corporation, pointed out in the article that originally "many dentists were apprehensive about what form the program might take and what its effects might be on private practice."

After three years of operation, a survey of 179 participating dentists showed that the vast majority felt that the patient-dentist relationship had been improved or was unchanged, 134 felt that fees were about right, and 148 said that they would like to see other unions adopt similar plans.

"Dentists and patients alike have expressed satisfaction with the plan almost unanimously. The trustees of the ILWU-PMA Welfare Fund have also expressed satisfaction," Dr. Howard reported, adding:

"A program of this type can be successful when the recipients are willing to provide adequate funds for a high level of service combined with proper administration."

The plan provides dental services to all children, until age 15, who are dependents of ILWU members. At the union's request, orthodontics, bridgework, and purely cosmetic services were not included because of the experimental nature of the program.

However, Dr. Howard said, "It seems possible that all services may eventually be included."

University of Michigan

During the coming school year the W. K. Kellogg Foundation Institute for graduate and postgraduate study, School of Dentistry, University of Michigan, is offering a series of short courses for orthodontists. Enrollment in these courses is limited to members and associate members of the American Association of Orthodontists.

The postgraduate courses for the orthodontist are as follows:

Cephalometric Radiography. Oct. 3, 4, and 5, 1960. R. E. Moyers, A. H. Craven, T. M. Graber, and staff.

Orthodontic Treatment During the Mixed Dentition. Oct. 24 and 25, 1960. B. F. Dewel and R. E. Moyers.

Practice Administration for the Orthodontist. Jan. 23 to 25, 1961. C. E. Martinek, R. H. Campbell and staff.

Orthodontic Treatment Planning and Selective Appliance Therapy. Feb. 20 and 21, 1961. W. L. Wilson.

Lancaster Cleft Palate Clinic

The Lancaster Cleft Palate Clinic announces that a seminar in diagnosis, research, and treatment of individuals with oral-facial-speech handicaps will be held Oct. 31 to Nov. 3, 1960. Members of the dental, medical, and speech professions may obtain applications by writing to Dr. M. Mazaheri, Chief, Dental Services, Lancaster Cleft Palate Clinic, 24 North Lime St., Lancaster, Pennsylvania.

Loyola University School of Dentistry

Loyola University School of Dentistry announces that two postgraduate courses entitled "Light Wire Differential Forces in the Treatment of Dental Malocclusions" will be given Dec. 4 to 10, 1960, at the Nassau Inn in Princeton, New Jersey, and Jan. 29 to Feb. 4, 1961, at the Sheraton Hotel in Chicago, Illinois. Both courses, limited to orthodontists, will be under the direction of Dr. Joseph R. Jarabak, Professor and Chairman of Orthodontics.

ADA Membership Tops 95,000

Membership in the American Dental Association reached 95,303 on June 30. This is an all-time record, exceeding the total for 1959. The current figure was more than 600 higher than the total for Dec. 31, 1959, and about 1,500 higher than the figure for June 30, 1959. The new record included 76,867 active members, 5,557 life members, 243 affiliate members, 24 associate members, 37 honorary members, and 12,575 students.

Second Specialty Conference

The Second Conference on Dental Specialties and Specialization was held at the Drake Hotel in Chicago on Sept. 7 and 8, 1960. The first conference took place in July, 1959, at the American Dental Association's Central Office. Various dental specialty boards, academies, and societies were invited to appoint representatives, and the Council on Dental Education requested that the names of these official representatives be submitted before August 10. The purpose of the second conference was to explain and discuss progress and development of the Council's study of problems related to practice in special areas of dentistry. This second phase of the Council's study deals with problems concerning definition of areas of dental practice and proposals for combining certain areas into groups. Representatives were asked to present their comments and questions concerning the report, which the Council will give to the House of Delegates at the annual session this October.

Joseph L. Bernier Succeeds James M. Epperly as Assistant Surgeon General

Major General Joseph L. Bernier has been named Assistant Surgeon General and Chief of the Army Dental Corps to succeed Major General James M. Epperly, who retired on July 31, 1960, after thirty-six and one-half years of active service. General Bernier, the first certified oral pathologist in the Army Dental Corps, is the former chief of the Dental and Oral Pathology Division at the Armed Forces Institute of Pathology (which he organized in 1946) and president of the American Board of Oral Pathology.

Death of Karl Häupl

Karl Häupl, extraordinary professor of dentistry and director of the West German Jaw Clinic at the Medical Academy in Düsseldorf, died in Düsseldorf, Germany, on June 29, 1960. Dr. Häupl was 67 years old.

Notes of Interest

Drs. Brooks Bell, Frank Roark, and C. A. Richardson announce the association of Dr. Jerry Clem, 4150 Mockingbird Lane, Dallas, Texas, practice limited to orthodontics.

Dr. James Clifford, 507 South George St., Charles Town, West Virginia, and the Boyd Building, Martinsburg, West Virginia, announces that his practice is now limited to orthodontics.

David S. Ehrich, Jr., D.D.S., M.S.D., announces the opening of his office for the exclusive practice of orthodontics at 545 Kearny Ave., Kearny, New Jersey.

Leigh C. Fairbank, D.D.S., announces his association in the practice of orthodontics with Harold G. Ott, D.D.S., at 1726 Eye St., N.W., Washington, D. C. (Dr. Fairbank was the first Brigadier General in the Dental Corps of the United States Army and Dr. Ott was formerly executive officer of the Dental Divison in the Surgeon General's office.)

Frank P. Gilley, D.D.S., M.S.D., announces the association of Charles Richard Cushing, D.M.D., at 135 Broadway, Bangor, Maine, in the practice of orthodontics.

Larry J. Green, D.D.S., M.S., announces the opening of his office at 1125 Highland Bldg., 121 South Highland Ave., Pittsburgh, Pennsylvania, practice limited to orthodontics.

Robert T. Neer, D.D.S., M.S., announces his association in the practice of orthodontics with Lewis C. Pinney, D.D.S., M.S., at 2919 Court St., Saginaw, Michigan.

Dr. Edward W. Peaslee announces the association of Charles R. Cushing, D.M.D., in the practice of orthodontics at 24 Green St., Augusta, Maine.

Eugene L. Reinstein, D.D.S., announces the opening of his office at 914 South Burdick St., Kalamazoo, Michigan, practice limited to orthodontics.

Budd Rubin, D.D.S., announces the opening of his office for the practice of orthodontics at 435 North Roxbury Dr., Suite 211, Beverly Hills, California.

Dr. Daubert Telsey announces that his practice at 31-16 30th Ave., Astoria, New York, is now limited to orthodontics.

Dr. Leonard P. Wahl announces the association of his son, Dr. Kenneth B. Wahl, in the practice of orthodontics, 518 First American State Bank, Wausau, Wisconsin.

Forthcoming meetings of the American Association of Orthodontists:

1961—Denver Hilton Hotel, Denver, Colorado, April 16 to 21.
1962—Statler Hotel, Los Angeles, California, April 28 to May 3.
1963—Americana Hotel, Miami Beach, Florida, April 28 to May 2.
1964—Palmer House, Chicago, Illinois, May 10 to 14.
1965—Dallas Statler-Hilton, Dallas, Texas, April 25 to 30.

OFFICERS OF ORTHODONTIC SOCIETIES

The AMERICAN JOURNAL OF ORTHODONTICS is the official publication of the American Association of Orthodontists and its component societies. The Editorial Board of the JOURNAL is composed of a representative of each of the component societies.

American Association of Orthodontists
(Next meeting April 16-21, 1961, Denver)

President, William R. Humphrey - - - - - - - - - Republic Bldg., Denver, Colo.
President-Elect, Dallas R. McCauley - - - - - - 410 S. Beverly Dr., Beverly Hills, Calif.
Vice-President, Cecil G. Muller - - - - - - - - 101 S. 35th Ave., Omaha, Neb.
Secretary-Treasurer, Earl E. Shepard - - - - - - - 225 South Meramec, Clayton, Mo.

Central Section of the American Association of Orthodontists
(Next meeting Sept. 18-20, 1960, St. Louis)

President, Leo B. Lundergan - - - - - - - - - - 8000 Bonhomme Ave., St. Louis, Mo.
Secretary-Treasurer, Kenneth E. Holland - - - - - - 1019 Sharp Bldg., Lincoln, Neb.
Director, Elmer F. Bay - - - - - - - - - - - 216 Medical Arts Bldg., Omaha, Neb.

Great Lakes Society of Orthodontists
(Next meeting Nov. 27-30, 1960, Cincinnati)

President, Hunter I. Miller - - - - - - - - - - - 1416 Mott Foundation Bldg., Flint, Mich.
Secretary, Edward A. Cheney - - - - - - - - - - 1201 Bank of Lansing Bldg., Lansing, Mich.
Director, Harlow L. Shehan - - - - - - 601 Jackson City Bank Bldg., Jackson, Mich.

Middle Atlantic Society of Orthodontists
(Next meeting Oct. 9-11, 1960, Atlantic City)

President, Kyrle W. Preis - - - - - - - - - - - 700 Cathedral St., Baltimore, Md.
Secretary-Treasurer, Charles S. Jonas - - - - - - Mayfair Apts., Atlantic City, N. J.
Director, Louis E. Yerkes - - - - - - - - - - - 825 Linden Ave., Allentown, Pa.

Northeastern Society of Orthodontists
(Next meeting Nov. 14 and 15, 1960, Boston)

President, Henry C. Beebe - - - - - - - - - - 60 Charlesgate West, Boston, Mass.
Secretary-Treasurer, David Mossberg - - - - - - 36 Central Park S., New York, N. Y.
Director, Norman J. Hillyer - - - - - - - 230 Hilton Ave., Hempstead, L. I., N. Y.

Pacific Coast Society of Orthodontists
(Next meeting Aug. 6-10, 1961, Seattle)

President, E. Allen Bishop - - - - - - - - - - - 703 Cobb Bldg., Seattle, Wash.
Secretary-Treasurer, Warren A. Kitchen - - - - - 2037 Irving St., San Francisco, Calif.
Director, William S. Smith - - - - - - - - - - 2530 Bissell Ave., Richmond, Calif.

Rocky Mountain Society of Orthodontists
(Next meeting Sept. 25-28, 1960, Santa Fe)

President, William A. Blueher - - - - - - - - - 801 Encino Pl., Albuquerque, N. M.
Secretary-Treasurer, E. H. Mullinax - - - - - - - 8790 W. Colfax, Lakewood, Colo.
Director, Ernest T. Klein - - - - - - - - - - - 707 Republic Bldg., Denver, Colo.

Southern Society of Orthodontists

President, M. D. Edwards - - - - - - - - - - - - - - - 132 Adams St., Montgomery, Ala.
Secretary-Treasurer, William H. Oliver - - - - - - - 1915 Broadway, Nashville, Tenn.
Director, Boyd W. Tarpley - - - - - - - 2118 Fourteenth Ave., S., Birmingham, Ala.

Southwestern Society of Orthodontists
(Next meeting Sept. 25-28, 1960, Kansas City, Kan.)

President, John W. Richmond - - - - - - - - 493 Brotherhood Bldg., Kansas City, Kan.
Secretary-Treasurer, Tom M. Matthews - - - - - - 8215 Westchester Dr., Dallas, Texas
Director, Nathan Gaston - - - - - - - - - - - - - 701 Walnut St., Monroe, La.

American Board of Orthodontics
(Next meeting April 10-15, 1961, Denver)

President, Wendell L. Wylie - - - - - - University of California School of Dentistry, San Francisco, Calif.
Vice-President, J. A. Salzmann - - - - - - - - - 654 Madison Ave., New York, N. Y.
Secretary, Alton W. Moore - - University of Washington School of Dentistry, Seattle, Wash.
Treasurer, Paul V. Reid - - - - - - - - - 1501 Medical Arts Bldg., Philadelphia, Pa.
Historian, B. F. Dewel - - - - - - - - - - - - 708 Church St., Evanston, Ill.
Director, Frank P. Bowyer - - - - - - - - - 608 Medical Arts Bldg., Knoxville, Tenn.
Director, Nathan G. Gaston - - - - - - - - - - - 701 Walnut St., Monroe, La.